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THE IRON TRADE REVIEW

VOLUME XXXI. CLEVELAND, O. AUGUST 11, 1898 CHICAGO, ILL. NUMBER 32

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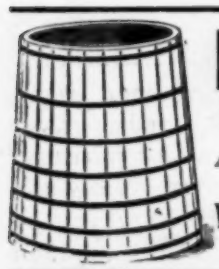

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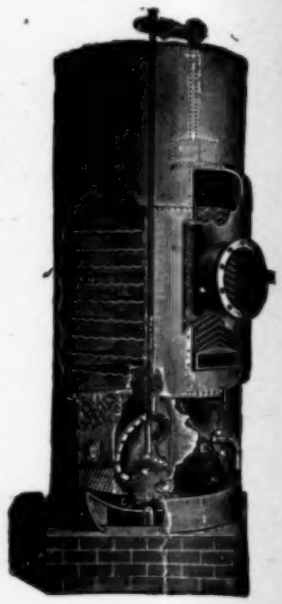

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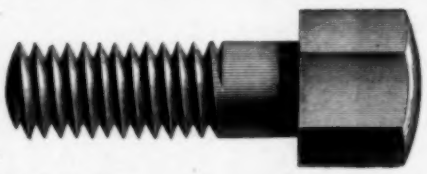

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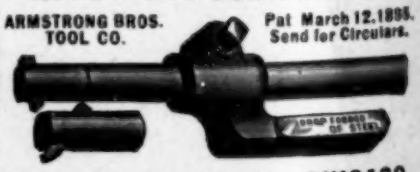

98 W. Washington St., CHICAGO.

THE IRON TRADE REVIEW

VOLUME XXXI. CLEVELAND, O. AUGUST 11, 1898. CHICAGO, ILL. NUMBER 32

THE WEEK IN IRON CIRCLES.

THE MARKET AT LARGE.

The iron trade has gained in strength in the past week. While there is persistent and widespread comment over the lagging of prices, in many lines, the fact is recognized that steady progress is being made toward conditions that must bring improvement in this particular. The statistical position in respect to pig iron showed a gain in July, due largely to the restrictive programme of Central Western furnaces, of which there are now fewer in blast than at any time in two years. Yet it is to be remembered in calculations based on this situation, that the idle list includes many particularly effective stacks, fully able to operate on to-day's low basis, and that the majority of these will be in blast in the fall. Higher quotations are made by a Southern interest, bringing No. 2 foundry up to $7.25 Birmingham, but the movement is not general and furnaces nearer the Ohio river are still delivering iron at the equivalent of $7 for No. 2 at Birmingham and a shade less. Soft grades are firmest. Chicago reports buying by an important consumer and a feeling that if the expansion of business counted on at home and abroad is realized, in the fall months, the prices of to-day are minimum. In the East better reports are given of the pig iron trade. The movement is broader, and though sales are at old figures, they are on a scale giving good promise for fall business. The Bessemer pig iron situation has not changed, except that every week brings nearer, in the opinion of furnacemen, the purchase of considerable blocks of iron at the $10 price. Recent transactions have been at $10.40 and $10.45, Pittsburg. Steel works are heavily sold, but the strike at the American Steel & Wire Co. mills, which gives some indications of spreading further among the plants of the consolidation, will relieve the pressure on billet mills from one source. At Pittsburg billets are quoted 25 cents higher. The structural demand is a leading feature in finished material. Chicago reports a large business in the past week, building and bridge requirements calling for several thousand tons. The meeting of manufacturers of structural steel last week advanced all shapes $1 a ton and business has been taken without difficulty at the advance, beams being now quoted 1.20c Pittsburg and 1.35c Philadelphia. The wrought pipe manufacturers at a meeting in Pittsburg decided to make an advance of 5 per cent. Some large contracts have been taken recently and the prospects of fall business are excellent. The cast iron pipe industry, on the other hand, is in unsatisfactory condition and every contract taken is sharply competed for by foundries anxious to provide steady runs. Car business keeps a strong pace, and purchases of material in the Chicago market the past week have been larger. Crop indications continue favorable and a large movement to the seaboard is assured by reports of European deficiencies. There are not wanting predictions, based on careful investigation, that Western roads are entering upon the best year in their history. Bar mills, axle forges and car wheel foundries will share in this prosperity. The Lake Superior ore movement, as at every other point in the season, has been beyond the record, but it is not expected that it will show the same rate of increase over 1897, in the remaining months.

PITTSBURG.

OFFICE OF *The Iron Trade Review and Industrial World.*
808 TRADESMEN'S BUILDING, AUG. 10.

August is keeping up the pace of last week and the last few days have witnessed advances in the prices of several classes of material and the demand is excellent in all finished lines. Sheet and tin plate bars and rods are very scarce and some mills are making no quotations on early deliveries. All along the line the outlook is extremely bright, though in some departments prices do not yet respond in the way that so large a business would suggest.

PIG IRON.—Bessemer iron is gradually approaching the furnacemen's price. There is practically no outside iron at present and the quotation in the valley is close to $10—from $9.80 to $9.90, and $10.40 to $10.50 Pittsburg. Unless something unforseen should happen, the agreed price promises soon to be the market price. A local consumer has bought about 40,000 tons within the last month with deliveries through the year. Gray forge is unchanged in price but shows more movement. It is quoted from $9 to $9.15. Foundry irons are in better demand but the price remains as given last week, No. 2 being quoted at $10 to $10.15. We quote as follows:

Bessemer, valley	$ 9.85 to $ 9.95
Bessemer, Pittsburg	10.50 to 10.60
No. 1 Foundry	10.40 to 10.50
No. 2 Foundry	10.00 to 10.15
No. 3 Foundry	9.50 to 9.75
Gray Forge, valley furnace	8.70 to 8.75
Gray Forge, Pittsburg	9.00 to 9.15

BILLETS AND RODS.—Billets have advanced within the last few days and are now decidedly firmer than at last report. A local mill is said to have declined an order for between 10,000 and 15,000 tons, delivery through the end of the year, at $15.25 maker's mill. It is only within the last few days that this condition was reached, as in the latter part of last week a local mill cut $14.75 maker's mill, considerably, on an order for 2,000 tons from outside the Pittsburg district. The range of quotations at present is from $15 to $15.25, maker's mill Pittsburg, and $14.75 Wheeling and valley district. Sheet bars are stiffer than last week, the quotations being from $17 to $17.25. In sheet and tin plate bars prompt deliveries are impossible. Rods, also, are scarce and if anything are firmer than last week. We continue the quotation of $20 to $20.50.

STRUCTURAL MATERIAL.—The good business of the past few months has led to an advance in price of $1 a ton. Orders continue to come in in good volume, and the mills are filled. Prices are as follows: Beams and channels, 3 to 15 inches, 1.20c; 18 to 24 inches, 1.30c; tees, 1.25c; zees, 1.20c and angles 1.10c. Universal plates alone at 1.15c; with other shapes, 1.05c.

IRON AND STEEL SKELP.—The demand continues good, especially for wider sizes, and in view of the prospective advance in pipes and tubes, the price of skelps may also go ahead. At present the quotations are: Grooved iron skelp, 1.05c to 1.07½c; sheared iron skelp, 1.10c to 1.12½c; grooved steel skelp, 0.95c to 0.97½c; sheared steel skelp, 1.10c to 1.12½c.

PIPE AND TUBES.—The pipe and tube manufacturers met here Tuesday and a 5 per cent advance was agreed upon. Mills are still running full and some are not seeking business unless particularly attractive. The discounts of 6 tens for less than carload and 6 tens and 5 per cent for carload lots are quoted. Base discounts are as follows: Butt weld, black, 57 per cent off; lap weld, black, 67 per cent off; butt weld, galvanized, 50 per cent off; lap weld, galvanized, 55 per cent off. Discounts on merchant boiler tubes are as follows: 2¼, inch and smaller, 72½ per cent off; 2½ inch and larger, 75 per cent off. Inserted joint casing is quoted at 60 and 5 per cent and screw and socket joint at 65 and 5 per cent. The advance in price noted above takes effect at once. Line pipe and oil country goods are not affected.

The new additional discount quotations of 6 tens and 6 tens and 5 are to the large trade, and supersede quotations of 6 tens and 5 and 6 tens and 7½ respectively for less than carload lots and carload lots.

SHEETS.—The conditions of a week ago as to volume of business may still be said to hold; some of the mills being booked to October, while others are not so well engaged. Prices are on the same basis. No. 28 is quoted at 1.92½c to 1.95c. The demand for galvanized sheets continues steady with quotations of 80 and 7½ to 80 and 10 per cent off list with 18 cents freight.

PLATES.—The mills report that business continues excellent and that the outlook is for even better conditions. Railroads are steady buyers and no one section seems to lead, the buying being general. Several good orders have been taken by a local mill in the last week and one still pending for material for 20 locomotives will likely go to the same firm. Prices are firm as follows: Tank, 1.10c; shell, 1.15c; flange, 1.20c; fire-box, 2c and upwards.

FERRO-MANGANESE.—This product continues steady at $49.50 to $50 for 80 per cent domestic delivered.

SPIEGEL.—The demand is generally in small lots and the movement is not sufficient to affect the quotation of $23.50 to $24 one way or the other.

RAILS AND TRACK MATERIAL.—There is continued good demand, with prices as follows: Rails, $18, Pittsburg; iron track bolts, 1.65c to 1.70c; splice bars, 1.10c to 1.15c; links and pins, 1.20c. Spikes, 1.40c to 1.45c.

SPELTER.—Narrow fluctuations continue. There was an upward jump in the past week but the price fell back almost immediately. It is now quoted at $4.50 to $4.55. The preliminary statement of C. Kirchhoff, special agent for the U. S. Geological Survey, reports the total production of spelter for the first six months of 1898 to be 57,743 net tons, the largest half-year output on record. For the last six months of 1897 the total was 53,077 tons of 2,000 pounds and for the first six months of 1897 it was 53,077 tons.

OLD MATERIAL.—The demand for old material continues light, the largest sale of the week being 1,000 tons of steel rails at $10 Pittsburg. We quote: Heavy mixed steel scrap, $10; old iron rails, $13.65 to $13.85, valley; cast borings, $5.75 net, valley; wrought turnings, $6.75 net, valley; railroad cast scrap, $9 gross; wrought scrap, $11.50 valley; iron axles, $16, net; steel axles, $12.50, gross; car wheels, $10.25 gross; charcoal scrap, $10, gross; billet and bloom ends, run of mill, $11; busheling scrap, $9, net; machine scrap, $9 gross.

CHICAGO.

OFFICE OF *The Iron Trade Review and Industrial World.*
1522 MONADNOCK BLOCK, Aug. 8.

Considerable business was done in nearly every branch of the iron and steel market last week, and the demand continues good for most grades of material. Finished material was especially active, sales of a large tonnage of structural shapes having been made, and the contracts closed for other shapes also making a very comfortable total. Manufacturers and dealers appear to have come to the conclusion that there will be a very large business for them to do for the balance of the year, and everywhere talk of the future is most encouraging. Many rumors are floating around of large new works of various kinds to be built in this territory, in the immediate future, and while nothing definite can be obtained of the plans of the promoters of these works, and it is not surely known anything will come of it all, there is undoubtedly more activity in industrial building, enlarging and renovating than has been seen here for the past five or six years. New foundry enterprises are especially plentiful, many concerns which have been in the habit of buying their castings in the past making arrangements to make them themselves.

PIG IRON.—Considerable business is being done every week, in small lots. In fact this class of trade is unusually large for this season of the year. The demand for all kinds of iron seems to be getting larger every week, and there are several good sized inquiries in the market at present which are expected to develop into orders within a short time. The largest sale made last week was one of several thousand tons of Southern iron to a concern outside of the city. This particular buyer is credited by the dealers with having "hit the market right" every time he has bought for several years past and the general talk, now that he has bought, is that prices "are sure to go higher soon." While in itself the fact that this particular concern has bought will hardly influence the market, it shows the tendency of astute buyers to place their orders while the present level of prices prevails. Local irons are very firm, and no concessions are made to secure business. Southern iron is firmer than it was a week ago, and some furnaces are asking more than we quote for their products, but as others are still making the low prices, the market can hardly be said to have advanced.

Lake Sup. Charcoal	$11 50 @ $13 00	Southern Coke No. 3	$ 9 75 @ $10 00
Local Coke Fdy. No. 1	11 50 @ 12 00	Southern No. 1 Soft	10 35 @ 10 60
Local Coke Fdy. No. 2	11 00 @ 11 50	Southern No. 2 Soft	10 10 @ 10 30
Local Coke Fdy. No 3	10 75 @ 11 00	Southern Silveries	11 25 @ 11 35
Local Scotch Fdy. No. 1	11 50 @ 12 00	Jackson Co. Silveries	12 50 @ 14 50
Local Scotch Fdy. No. 2	11 00 @ 11 50	Ohio Strong Softeners	12 00 @ 12 20
Local Scotch Fdy. No. 3	10 75 @ 11 00	Alabama Car Wheel	15 00 @ 16 00
Southern Coke No. 1	10 35 @ 10 60	Malleable Bessemer	11 50 @ 12 05
Southern Coke No. 2	10 10 @ 10 35	Coke Bessemer	11 50 @ 12 00

BARS.—Several good sized contracts were closed last week, including one for 2,000 tons of steel bars. The demand continues to be good from nearly all classes of buyers, and seems likely to be so for some time. Quotations are unchanged at 1.05c to 1.10c for common iron; 1.15c to 1.20c for guaranteed iron; 1.10c to 1.15c for soft steel bars from strictly billet stock.

RAILS AND TRACK SUPPLIES.—The local mills made sales of about 2,000 tons of rails last week, and have inquiries in hand for a considerable tonnage which probably will be placed soon. Quotations are as follows: Rails, $20 to $22.50, according to specifications; steel splice bars, 1.15c to 1.25c; track bolts, with square nuts, 1.80c to 1.90c; hexagon nuts, 1.90c to 2c; spikes, 1.50c to 1.60c.

BILLETS AND RODS.—No sales of billets were made last week by the local mills, but they sold about 2,000 tons of rods, in small lots. The demand for rods is heavy, and much more could have been sold if the mills could have handled the business. Outside mills secured a good tonnage. The market for rods is firmer than a week ago, and prices are now made at $22. Billets are quoted at $16.

CAR ORDERS.—The Union Pacific placed a contract last week for 1,000 cars, and the B. & O. is said to have placed 2,000. Several other good contracts were given out, and more business is expected to be placed immediately. Car material is in excellent demand, and sales have been large. Among the contracts placed was one of 20,000 car axles, making about 5,000 tons of material.

STRUCTURAL MATERIAL.—The week was the best in some time. The only large contract placed of which definite information could be obtained was that for the five bridges for the Drainage Canal, taking about 2,000 tons of material. Of these, four were let to C. L. Strobel, of Chicago, and one to the Wisconsin Bridge & Iron Works of Milwaukee. The eight track sectional bridge has not yet been decided upon. In addition to this business a number of large contracts for car and bridge material were placed. One concern took contracts aggregating over 20,000 tons of these classes of material. The market is stronger, and prices have been advanced $1 per ton on all shapes. Quotations are as follows.: Beams, 15-inch and under, 1.35c to 1.40c; 18-inch and over, 1.45c to 1.50c; angles, 1.25c to 1.30c; plates 1.20c to 1.30c; tees, 1.40c to 1.45c; zees, 1.35c to 1.40c. Small lots from stock are quoted at ¼c to ½c higher.

PLATES.—There is a very large demand for plates of all kinds, but as the local mills are so full of business as not to be able to handle any for nearby delivery, most of it is going farther East. A considerable tonnage was placed last week,

including several large contracts. Prices are firmer, and many mills are selling at higher figures than we quote. Prices are made as follows: Tank steel, 1.15c to 1.25c; flange steel, 1.20c to 1.40c; fire box steel, 1.85c to 5c.

SHEETS.—The demand is very good, and sales last week were rather in excess of those of the week previous. Several good contracts were closed for both black and galvanized sheets. Black sheets are quoted on the basis of 2c to 2.05c for No. 27 and galvanized at 80 and 10 per cent off, with the usual freight allowances.

MERCHANT STEEL.—The demand is excellent. Sales last week were large and included several important contracts. Contract buyers in many cases are placing a larger business than ever, this year. General business in small and large lots is good, and makes a large total for the week. Prices are as follows: Open-hearth spring, tire and machinery steel, 1.60c to 1.70c; smooth-finished machinery steel, 1.55c to 1.65c; smooth finished tire, 1.45c to 1.55c; tool steel, 5.50c to 7.50c; specials, 11c and upwards

SCRAP.—This branch of the market continues quiet, and shows little business doing. There is somewhat of a shortage of cast scrap, and quite a good inquiry for this grade, but other grades are selling very slowly. Dealers' selling prices are as follows:

Old iron rails, gross,	$12 25@$12 50	Axles, net	$14 25@$14 75
Old steel rails, long, gr.	10 50@ 11 00	Cast borings, net	4 25@ 4 50
Old steel rails, short	8 75@ 9 00	Wrought turnings, net	6 00@ 6 50
Old wheels, gross	11 00@ 11 50	Axle turnings, net	7 00@ 7 25
Railroad forge, net	11 50@ 12 00	Mixed steel, gross	7 25@ 7 50
Dealer's forge, net	10 00@ 10 50	Stove plates, net	5 75@ 6 00
No. 1 mill, net	7 50@ 8 00	Heavy melting steel, gr.	8 25@ 8 50
Heavy cast, net	8 50@ 9 00	Old iron splice b., net.	12 75@ 13 00
Malleable cast, net	8 00@ 8 50		

CLEVELAND.

OFFICE OF *The Iron Trade Review and Industrial World*, 27 VINCENT ST., Aug. 10.

The movement of ore from upper lake ports was slightly less in July than in June, yet the total to Aug. 1, as shown by official figures received by Cleveland ore firms was 6,818,887 tons—an unprecedented amount, 1,400,000 tons beyond the record of 1897 to the corresponding date. The statement of the two seasons by months is as follows, in gross tons:

To June 1, 1897	1,105,637	To June 1, 1898	2,334,039
June, 1897	2,044,652	June, 1898	2,278,134
July, 1897	2,265,271	July, 1898	2,206,714
Total to Aug. 1, '97	5,415,560	Total to Aug. 1, '98	6,818,887

If the shipments from Aug. 1 to the end of the season this year should be the same as last year's, the total water movement for 1898 would be 13,590,835 tons. Dock conditions at lower lake ports are not materially improved over last year, and the rate of shipments thus far has been made possible by mine stockpiles on which large inroads have been made. The possibilities of freight advances are being canvassed, and while a large grain movement is looked for, it is not expected to make any significant change in ore rates this month. The rate of 40 cents made on a block of Escanaba ore, last week, running into the latter part of September, promises to be higher relatively than the Lake Superior rate for about two-thirds of the period covered. Wild cargoes from Lake Superior are still placed at 45 cents. Yet the 40-cent Escanaba term contract caused no little commotion among vessel men. There is something doing in ore, week by week, chiefly in non-Bessemers and Mesabi grades. The 90,000 tons of non-Bessemer from the Menominee range bought last week goes to Pittsburg as part of a basic mixture.

PIG IRON.—There is no report, as yet, of Bessemer purchases at $10, furnace. Some further sale by a Northwestern Pennsylvania furnace is reported on a basis slightly below this. Allegheny county is evidently consuming more Bessemer than it produces and the establishment of the $10 price is confidently looked for. An inquiry for low phosphorus metal is up but the business has not been placed. Locally there is little activity in foundry iron at the moment and car lot to 50 and 100 ton business is well competed for. On some recent purchases weak prices have developed, and $9.75 Cleveland has been done on No. 2 foundry, though $9.50, valley, is still the quotation of the majority of sellers. Gray forge is quoted $8.65 to $8.75 valley furnace. We quote f. o. b. Cleveland:

Bessemer	$10 65	Valley Scotch No. 1	$10 40@10 65
No. 1 Strong Foundry	10 40@10 65	Valley Scotch No. 2	10 25
No. 2 Strong Foundry	10 10@10 25	Gray Forge	9 25
No. 3 Foundry	9 65	Lake Superior Charcoal	11 50

BILLETS AND RODS.—Steel mills have a large tonnage under contract. Local wire and wire rod mill shut-downs will tend to ease the situation as to billet deliveries. Late sales of Bessemer slabs for Cleveland delivery have been made at from $14.75 to $15, though other sellers are quoting higher figures. Some open-hearth tonnage in slabs is under inquiry. We quote rods at $20 Cleveland.

FINISHED MATERIAL.—The advance of $1 in structural shapes ordered last week applies to all material except small angles, on which there has been and is cutting below the pool basis. Beams and channels are now quoted 1.28½c Cleveland. Angles have been sold at about 1.05c delivered. As a matter of fact much of the structural business recently in the mills has been under old contracts, closed before the 1.15c Pittsburg price went into effect. Plate mills are from two to five weeks behind orders and prices are quite firm at 1.07½c to 1.10c Pittsburg for tank. In bar iron there continues to be a large volume of business with prices practically unchanged at 1c Cleveland. The sheet market continues fairly active, with mill quotations at 2c for No. 27, and correspondingly higher prices asked for material out of stocks.

CINCINNATI.

Aug. 9.

The slight improvement in the market noted a week ago has been emphasized during the week under review. The tonnage booked and the increased inquiries give evidence of a revival of general business. Several good sized orders have been booked during the week and the orders for small lots and car loads have aggregated a good volume. The indications favor a still larger demand in the immediate future. The car works are enjoying more orders and there seems to be a general movement on the part of the railroads to prepare for an extraordinary traffic reasonably expected this autumn. The leading furnace companies of the South have advanced their prices somewhat, approximately 25 cents per ton on the average, though their figures continue still conservatively low. Northern furnaces have had a sufficiently improved demand to warrant them in holding firm to their views as to prices and the buyers seem to realize that purchases at current prices are entirely safe. Deliveries on old orders are heavy and consumers generally are urging shipments forward, many anticipating deliveries provided for in contracts. We quote for cash f. o. b. Cincinnati: Southern coke No. 1 foundry, $9.50 to $9.75; No. 2, $9.25 to $9.50; No. 3, $8.85 to $9; No. 4, and gray forge, $8.50 to $8.75; mottled, $8.50 to $8.75; No. 1 soft, $9.75; No. 2, soft, $9.25 to $9.50; Tennessee charcoal, No. 1, $12.50 to $13; Hanging rock charcoal, No. 1, $14.50 to $15.50; Jackson Co., silvery, No. 1, $12 to $12.50; standard Georgia car wheel, $14.25 to $15.

PHILADELPHIA.

Aug. 9.

There is a steadiness in the market that seems to be a token of better prices, though nothing in this direction is to be noted as yet, outside of one or two rolled products. The tendency is unmistakably toward firmness. A better movement is reported in pig iron. Sales are more general and on a larger scale than in early weeks of the summer, and the beginning of fall business is undoubtedly on. Pig iron prices are unchanged, but no fear appears now of anything lower, and some hope is expressed that more buyers will be encouraged to take the firmer attitude of a few. The regularity with which deliveries are taken on contract is still a feature. We quote No. 1X foundry, at $11 25 to $11.50; No. 2X at $10.50 to $10.75; No. 2 plain, at $10 to $10.25; standard mill iron, $10 to $10.25; ordinary mill iron, $9 75 to $10; Bessemer, $12 to $12.50; low phosphorus, $16 to $16.25. There is a firmer feeling in billets, though little is doing. The quotation is $16.75 for delivery over the next three months. Mills generally report a good run of orders and full operation in nearly all departments. Plates are stronger, with some sellers asking 50c. to $1 a ton more than in July. We quote: Beams and channels 1.35c, up to 15 inches; refined iron bars, 1.05c to 1.10c; steel bars, 1.10c; angles, 1.25c; tank plates, 1.22½c to 1.27½c. There is little demand for old material and bidders are naming lower figures. We quote delivered prices as follows: Choice railroad scrap, $12 50; No. 1 yard scrap, $10.50; No. 2 light scrap, $7.50; machinery cast, $9; heavy steel scrap, $9.75; old iron rails, $12; old steel rails, $9.75; wrought turnings, $8; cast borings, $7; old car wheels, $9.75; iron axles, $15; steel axles, $12.50.

THE IRON TRADE REVIEW
AND
INDUSTRIAL WORLD.

DEVOTED TO MACHINERY, METAL-WORKING AND FOUNDRY TRADES AND IRON AND STEEL MANUFACTURE.

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TRADE BALANCE IN IRON AND STEEL.

In its issue of one year ago *The Iron Trade Review* printed several columns of communications from prominent manufacturers of iron and steel, substantially agreeing in the opinion that our export trade in the products of their plants, which was then attracting a good deal of attention, would steadily increase and in time would become an important factor in our foreign commerce. Now that the returns have been made up for the fiscal year ending June 30, 1898, it appears that the predictions then made have been fulfilled thus far:

IRON AND STEEL EXPORTS FROM UNITED STATES IN THE YEARS ENDING JUNE 30, 1896, 1897 AND 1898, WITH VALUES FOR TWO YEARS.

	Gross tons. 1898.	Gross tons. 1897.	Gross tons. 1896.	Value. 1898.	Value. 1897.
Scrap	60,195	16,566	1,172	$ 632,334	$ 193,503
Pig iron, ferro	8,403	168,890	29,862	344,743	2,331,771
" all other	227,465			2,585,252	
Bar iron	5,495	3,466	3,523	181,845	126,646
Steel bars	16,139	41,293	2,673	451,468	1,121,090
Iron rails	2,769	4,181	5,382	37,150	79,488
Steel rails	229,783	107,891	22,263	4,613,376	2,482,208
Billets, ingots, blooms	*16,100	(*)	(*)	290,827	(*)
Hoops and bands	1,552	384	222	47,327	16,984
Wire rods	*14,468	(*)	(*)	330,022	(*)
Iron sheets and plates	4,057	1,906	488	182,809	92,332
Steel " " "	12,215	2,497	807	354,579	118,965
Tin plates	† 9	(†)	(†)	962	(†)
Structural iron and steel	*30,585	(*)	(*)	1,183,482	(*)
Wire	61,139	48,093	31,664	2,593,194	2,342,617
Cut nails	14,424	11,373	9,255	612,234	519,471
Wire nails	10,221	4,438	3,586	458,787	357,541
All other, inc. tacks	1,923			345,722	
Pipes and fittings				3,092,016	(*)
Car wheels—No	21,006	18,550	14,635	139,446	112,187
Castings, n. e. s				804,975	589,432
Cutlery				156,528	178,387
Firearms				672,223	644,992
Builders' hardware				3,997,796	4,152,836
Saws and tools				2,430,536	2,474,630
Electrical machinery				*2,052,564	(*)
Metal working machinery				*4,618,683	(*)
Printing presses				874,515	649,710
Pumps				*2,023,034	(*)
Sewing machines				3,136,364	3,340,241
Shoe machinery				*895,788	(*)
Fire engines—No	9	2	5	7,497	6,700
Locomotive engines—No	468	338	251	3,883,719	3,225,831
Stationary engines—No	565	423	324	398,570	323,438
Boilers and engine parts				927,552	671,901
Typewriters				1,902,153	1,453,117
All other machinery				13,336,930	19,771,856
Safes—No	*1,349	(*)	(*)	87,614	(*)
Scales and balances				343,200	381,886
Stoves and ranges				382,980	325,625
Other m'f'res iron and steel				9,266,731	9,112,403
				$70,367,527	$57,497,305

*Not separately stated prior to July, 1897.
†Not separately stated prior to December, 1897.

Were the persons to whom reference has been made above to write to-day upon foreign trade in iron and steel, we fancy their statements would be far less guarded and conservative. The exhibit which we have compiled from the Treasury Department statistical volume, just issued, is only a promise, we may assume, of the increase that is to come in the years just ahead.

The values of iron and steel exports in 1896 and 1895 were $41,160,877 and $32,000,989 respectively. Thus the table shows that in three years the total has more than doubled. The tonnage increase is greater, since there has been a considerable decline in the value of most of these products in the three years.

It would be interesting to know the exact tonnage of the products enumerated above, but, as will be seen, the statement in tons is confined to pig iron and rolled products. Machinery and hardware being never reckoned in tons, in commercial transactions, it is impossible to approximate their tonnage. The value of products not stated in tons is about three times that of products so given; but as machinery, with the multiplication of processes required in its production, increases rapidly in value over its raw material and over rolled iron and steel, there is no basis of comparison. The total of the tonnage figures in the 1898 column of the above table is 737,958, as compared with 429,528 tons of the same articles in the year ending June 30, 1897—the handsome increase of 308,459 tons or 72 per cent. We believe it safe to put the total exports of iron and steel in the past year, including that used in the manufacture of agricultural implements, railroad and other cars, carriages, cycles and cycle parts, at 1,250,000 tons.

The value of agricultural implements exported in the year ending June 30 was $7,609,732 a substantial increase over the total for the fiscal year 1897—$5,240,686. Cars for steam and other railways were exported to the value of $1,738,581 the past year, against $990,950. Including all other carriages, apart from cycles, the total was $3,424,419, against $2,946,710 in the fiscal year 1897. The total of cycles and cycle part was $6,846,529, against $7,005,323.

The noteworthy increases in the table given above are in pig iron (including ferro), from 168,890 to 235,868 tons; steel rails—from 107,891 tons to 229,783 tons, or more than double; and wire, from 48,093 tons to 61,139 tons. Structural material was not separately stated previous to July 1, 1897, so that no comparison is possible. The apparent falling off in steel bars, comes from the fact that previous to July 1, 1897, the classification was "steel ingots, bars, etc.," and included also rods. Therefore, in comparing the 41,293 tons credited to "steel bars" in 1897, in the table, we must add three 1898 items—16,139 tons of steel bars, 16,100 tons of billets, ingots and blooms, and 14,468 tons of wire rods—a total of 46,707 tons. The beginning of tin plate exports will be noticed—a total of 9 tons for the year. This is an item in which some growth may be expected by another year.

Machinery exports increased from $29,442,884 in the year ending June 30, 1897, to $34,057,369. By another year some comparison can be made be-

tween the items separately classified for the first time in the past year—electrical, metal working and pumping machinery and printing presses. These account for $9,500,000 of what otherwise would be classified as "other machinery." This latter omnibus class, amounting to $13,336,930 last year, would stand some further separation of items.

The import statement shows a falling off from the total of the preceding year. The tonnage was 155,925, as against 196,286 in 1897, 369,585 in 1896 and 324,077 in 1895. The table below shows the lines in which the falling off has been most pronounced. The Dingley tariff has made further reduction in tin plates, which are getting close to the total of re-export drawback plates. The table gives comparisons with the three years preceding:

IRON AND STEEL IMPORTS IN THE FOUR YEARS ENDING JUNE 30, 1895 1896, 1897, 1898.—GROSS TONS.

	1898	1897.	1896.	1895.
Pig iron	25,640	22,159	88,125	14,174
Scrap iron and steel	1,503	3,410	10,747	2 098
Bar iron	15,177	13,459	21,830	12,926
Iron and Steel Rails	529	7 777	1,056	784
Hoop and band iron	31	2	39	173
Ingots, blooms, etc	13,760	17,661	30 720	13,441
Sheets and plates	2 634	4,220	10,065	25,130
Cotton ties	.....	7,361	3,485	5
Tin plates	76,635	102,711	171 937	226,803
Wire rods	17,679	14,801	26,861	22,996
Wire	2,338	2,825	4,717	5.547
	155,925	196,286	369,585	324,077

The value of imports of iron and steel in the year was $12,615,913, compared with $16,094,557 in the fiscal year 1897, $25,338,103 in 1896, and $23,048,515 in 1895. Iron ore imports, whose value is not included in the above, were 352,555 tons valued at $470,089 against 543,241 tons valued at $778,084 in 1897, and 776,283 tons in 1896. The Cuban war and low-priced Mesabi ores account for the decline in the past year.

It is interesting to note at what a rapid pace the balance of trade in iron and steel has been accumulating to the credit of the United States. We give a statement for six years, beginning with the year ending June 30, 1893, the last in which imports were more valuable than exports. In that year we imported tin plates to the value of $17,565,640, against $3,809,148 last year—a marvelous change in five years:

IRON AND STEEL IMPORTS AND EXPORTS OF THE UNITED STATES.

Fiscal year.	Imports.	Exports.	Excess.
1893	$34,450,734	$30,106,482	Imp. $4,344,252
1894	20,594,373	29,214,393	Exp. 8,620,020
1895	23,048,515	32,000,989	" 8,952,474
1896	25,338,103	41,160,877	" 15,822,774
1897	16,094,557	57,497,872	" 41,400,624
1898	12,615,913	70,367,527	" 57,751,614

THE Playford Stoker Co., of Cleveland, has received an order from Reeves Bros., Alliance, O., for four stokers of 125 h. p. each, to be installed in a plant at New Philadelphia, O., which the Alliance firm has under construction.

THE Maryland Steel Co., and other shippers of Cuban ores, filed a protest at Washington against the export duty of 15 cents a ton on ore fixed by the new government at Santiago de Cuba, in addition to the old duty of 5 per cent. It is claimed that the tax is prohibitive.

Shipments from Buffalo furnaces are going forward at a tremendous rate, especially so when it is taken into consideration that we are in the midst of the usually dull summer months. The advance made by one leading Southern furnace has not affected that market as yet, though prices remain very firm.

PERSONAL.

John Sandford, of the Eskbank Iron Works, Lithgow, New South Wales, is making a tour of the United States investigating the various processes in use here for the manufacture of finished iron and steel. Mr. Sandford was in Chicago the early part of this week, spending a day at the South Works of the Illinois Steel Co., and visiting other plants in that city. From Chicago Mr. Sandford goes to Pittsburg.

Irvin McDowell, of Chicago, who has been traveling through Japan, China, and Australia in the interest of Rogers, Brown & Co., has returned home and reports a successful trip. The American iron sent to these countries has given general satisfaction and a foundation has been laid for an extensive export trade. The Scotch iron now used in foreign countries is of good quality and an equally good pig must be supplied from here to supplant it. Rogers, Brown & Co. have established themselves in this trade and will continue the aggressive work they have begun. Mr. McDowell may return soon to Japan and China to follow up the business he started there last winter.

A London letter to a New York newspaper says that Andrew Carnegie has purchased Skibo Castle and the entire estate, including 20,000 acres, for $1,000,000. At his request the neighboring hamlet of Ardgay has been made a postal town.

E. J. Bird, Jr., of Ironton, O., has become manager of the Dayton Coal & Iron Co. furnaces at Dayton, Tenn.

Geo. B. Miller will succeed E. D. Miller as manager of the Waterloo (Ia.) Gasoline Engine Co.

Koran Sugahara, chief engineer of the Kobu Railway Co., and of the Buso Chuo Railway Co., in Japan, is in Pittsburg. These roads have Tokio as their terminus, the first, a double-track road, being about 30 miles long, and the latter, a single track one of 70 miles. Mr. Sugahara is also the chief engineer for another road out of Tokio, about 100 miles long, now in course of construction. He left Japan July 8, and reached Pittsburg Aug. 1. He will remain through the month, inspecting 7,000 tons of steel rails the Carnegie Steel Co. is rolling for his roads.

H. C. Edwards, for many years manager of the Illinois Iron & Bolt Co., Carpentersville, Ill., has retired from that office and from business. He will continue to serve as a director of the company, and his son, A. D. Edwards, will act as a director and as purchasing agent, as heretofore.

Col. L. Heber Smith died suddenly at his home at Joanna Furnace, near Birdsboro, Pa , Aug. 4, of heart trouble. Col. Smith was 68 years old. He was president of the Cornwall Ore Banks Corporation, and owner of the Joanna charcoal furnaces.

Robert W. Hunt, of the R. W. Hunt & Co. Bureau of Inspection, Chicago, left from Montreal July 28 for a two months' business and pleasure trip to Europe.

Steel Scrap in the Cupola.

TO THE EDITOR:

"Malleable," in your issue of Aug. 4, asks for opinions on adding steel or wrought iron scrap to mixtures for malleable castings in cupola work. He believes there is no special advantage in doing so and therein he is right, for running the cupola for gray iron castings, and running it for malleable work are two widely different things. In the first case eight pounds of iron to one of coke is a proportion which gives good hot iron, while for the second much more must be used to get the iron as thin as running water, so that it will completely fill a mold containing, say, 124 strap buckles gated to one runner. Now, what would happen to steel or wrought iron melting and dropping through such a quantity of incandescent coke? Some one has shown—Mr. West, I believe—that they would quickly absorb enough carbon to become a cast iron.

Another point: "Malleable" puts 250 lbs. of steel scrap with 2,000 lbs. of regulation material. What can he expect with so great a proportion but a mass of burnt iron after the steel begins to come down? Possibly 50 lbs. of steel would have accounted for itself all right in the weighing up. Your correspondent states that he must make better castings than ordinary jobbing work. The solution of his difficulty lies elsewhere. Let him abandon the cupola for a small straight-draft furnace using plenty of coal, and he will obtain better success than by adding steel scrap to a cupola charge with all the attending evils.

STEEL.

METAL STRAIGHTENING AND CUTTING-OFF MACHINE.

John Adt & Son, of New Haven, Conn., have recently added to their line of machinery, a sheet metal straightening and cutting-off machine, designed by the proprietor, F. B. Shuster. The construction and operation are shown in the accompanying cuts. Fig. 1 is a view of the machine in operation. Fig. 2 is a side elevation of the roll-supporting head and its supporting standard, an end elevation of the cutting-off press integral with the head, and a broken view of the machine extension, consisting of a large tubular supporting shaft and table operating rods and table. Fig. 3 is a front elevation of the press and extension.

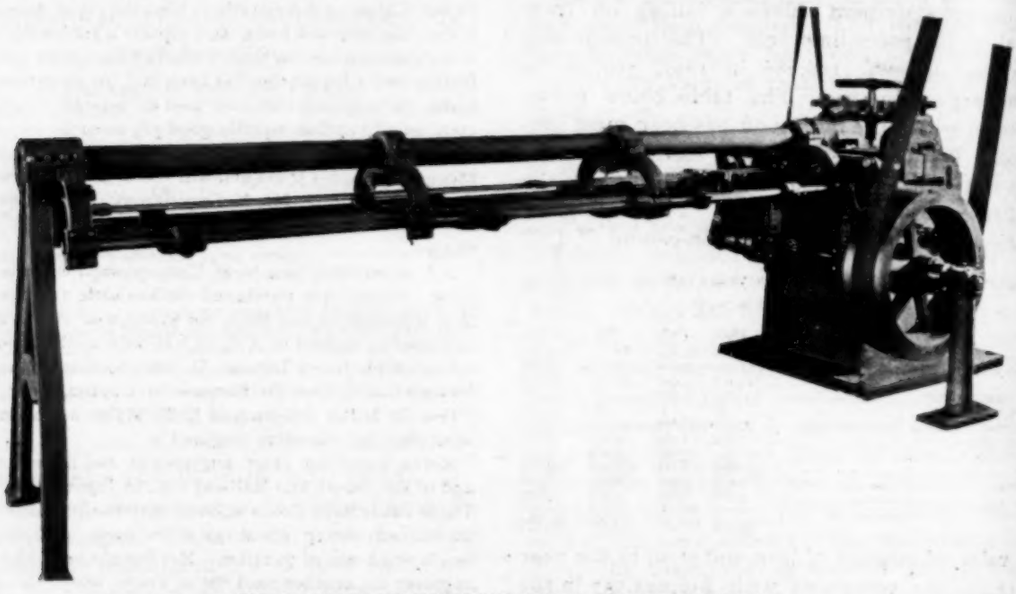
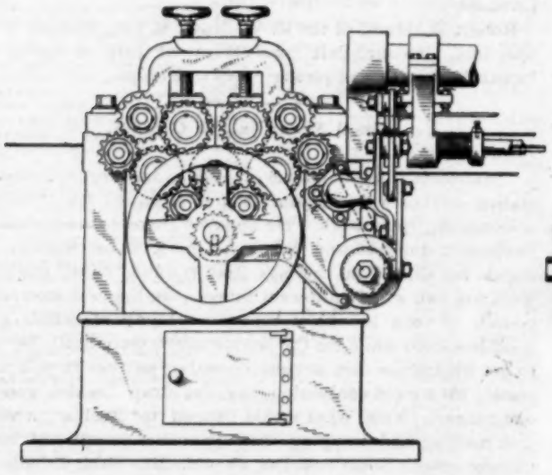


FIG. 1.—METAL STRAIGHTENING AND CUTTING-OFF MACHINE.

The machine is entirely automatic. The special features of its operations are these: The metal is straightened and fed to a certain length; the further feeding of the rolls is instantly checked; the metal cut off into predetermined lengths, and these lengths automatically delivered from the machine, all in one operation.



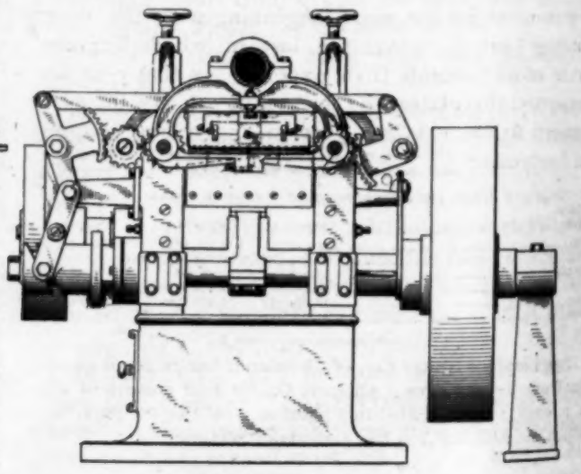


FIG. 2. METAL STRAIGHTENING AND CUTTING-OFF MACHINE. FIG. 3.

The metal strip is delivered from a reel and is carried through the straightening rolls shown in Fig. 2, while the cutting press mechanism remains stationary. The strip is carried along the table, until its end strikes a trip-plate. This actuates a lever and wire and communicates motion which causes the cutting-press driving shaft to rotate and carry a knife up to sever the metal strip. At the same time the further feeding of the rolls is stopped and thus the metal can be cut off at any length within the capacity of the machine, as determined by the position of the trip-plate. In the meantime a cam operates segment gears and opens the tables, allowing the severed metal strip to drop therefrom.

When the cutting press driving shaft has completed its revolution, the tables will have been carried back to their closed position by the action of the cam and the segment-gears referred to above, and the roll-feeding mechanism will be brought into operation for the feeding forward of another length of metal. A spring, meantime, carries the trip-plate back to its normalvertical position in readiness for the forward feed.

The machine is a considerable advance over the old method, in which the metal was simply straightened and then carried to the cutting-off machine.

The Diamond Machine Co., of Providence, R. I., has made a specialty for many years of knife grinders for sharpening all classes of knives used in planing, paper, bark and tin plate mills, etc. Many of these machines have gone to South America, South Africa and Japan. Since Jan. 1 of this year the company has been very busy in this department. It has just shipped a 90-inch machine to Germany and is building another of the same size for a concern in Waterbury, Conn., as well as several smaller ones, some of which are going abroad.

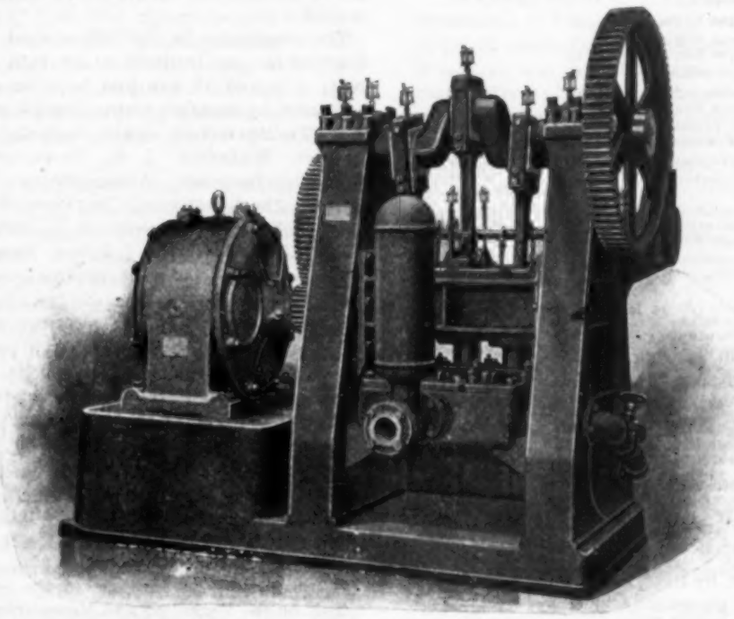
THE International Paper Co., of Piercefield Falls, N. Y., has placed a contract with the Riter-Conley Co., of Pittsburg, for the construction of an immense wood caldron for its plant. It will be 40 feet high with a diameter of 15 feet and will be made of one and one-eighth inch steel plate.

USE OF ALTERNATE-CURRENT MOTORS.

The old prejudice against the alternate-current motor has passed away and this type of machine has given demonstration of its superior utility in a number of peculiarly trying applications The culmination of the development of this type, whether in monophase or polyphase systems, is seen in the Tesla "Type C" induction motor, as made by the Westinghouse Electric & Mfg. Co. This motor has been frequently described in these columns, and the essential feature is familiar —the absence of any connections between the mains and the rotating parts.

The installation of these motors by the Silver Springs Bleaching & Dyeing Co., of Providence, R. I., has shown their special fitness for a peculiar line of service. This company, under the ownership of Gov. Lippitt, of Rhode Island, was a pioneer in the use of electrical apparatus for mill purposes. Very early in the use of electrical power, Gov. Lippitt purchased two direct current dynamos, which were used for lighting and power service until 1895. At this time the necessity for large extensions of the Silver Springs plant induced the company to investigate the modern developments in lighting and power service. After thorough study, Mr. E. C. Myrick, the company's engineer, recommended the adoption of the Westinghouse three-phase system, 3,000 alternations, for both lighting and power. The results of two years of active service under trying conditions have proved entirely satisfactory. In addition to lighting the entire plant, some 30 Westinghouse induction motors of from 3 to 75 h. p. have been installed. These motors are employed for driving washing machines, ironing machines, tentering frames, triplex pumps, elevators, ventilating fans, etc. Some of the motors operate constantly in a cloud of steam where a direct current motor could not run for five minutes. Many are subjected constantly to the action of chloride fumes and all the copper parts of the motors and switches are green with corrosion. In many of the operations, enormous starting torque is required, the initial torque in some cases being four times the normal torque of the motor.

The plant has proved so satisfactory that it has recently been extended by an installation of 10 more of the Tesla "Type C" motors, made by the Westinghouse company. The accompanying illustration shows one of these motors direct connected to a triplex pump.



WESTINGHOUSE ALTERNATE-CURRENT MOTOR DIRECT-CONNECTED TO TRIPLEX PUMP.

THE American Steel & Wire Co., in view of the strike now on in the wire drawing departments of its American and HP mills in Cleveland, has closed down the rod mill of the former and started upon some improvements that have been in contemplation for some time but would have been deferred doubtless but for the strike. Laughlin heating furnaces are to replace the old furnaces in the Garrett mill and a galvanizing house three stories high will be erected in place of the old building which is now being torn down.

RECEIVED FROM THE TRADE.

The Playford Stoker Co., of Cleveland, illustrations and details of whose improved stoker, with sectional grates, have appeared in these columns, issues an illustrated catalogue which presents the results of experience at a number of plants using the Playford stoker with sectional chain grates. The early portion of the catalogue is given up to a description of the special features embodied in this stoker, with illustrations showing the carriage, grates in position, ash conveyor (a special feature of this apparatus), coal hopper and water-front gate, with its controlling mechanism. There is a chapter on "Mechanical Furnaces vs. Hand-Fired Furnaces," and one on the probable earning power of the investment in a mechanical furnace. Views are given of various types of boilers equipped with the Playford apparatus.

We have received from the Bourne-Fuller Co., sales agents, Cleveland, the edition for 1898, the fourth of the hand-books issued by the Cambria Iron Co., Johnstown, Pa., under the title "Cambria Steel." It is much larger than its predecessors, and in place of the tables of weights and dimensions of the earlier editions, it includes plates of sections, complete tables of weights, dimensions and properties of the principal structural shapes manufactured by the company. There are also data, formulæ and tables valuable to engineers, construction companies and others. Special tables relative to structural shapes are prepared for this edition, those giving the properties of I-beams, channels and angles, safe loads of I-beams and channels and spacing of I-beams being given in detail for each section. In its preface the company notes that beams and channels and structural angles are made to conform to the American standards adopted in December, 1895, and January, 1896. The flanges in beams and channels have uniform slope of 1 to 6. The angles include 11 base sizes, or a total of 60, for equal leg angles, and 9 base sizes, or a total of 74, for unequal leg angles, the variations in thickness being 1-16 inch. Weights of rolled sections are calculated on the basis of 489.6 pounds per cubic foot of steel, and 3.4 times the sectional area in square inches equals the weight in pounds per lineal foot. For cutting material to exact lengths or with less variation than three-quarter inch, an extra price is charged. The hand-book contains 350 pages of valuable matter and will have an important place with engineering and construction interests.

The Hayden & Derby Mfg. Co., 111 Liberty st., New York, introduces several new features in its catalogue for 1898, just issued. In the ratings of injectors, the horse power is given not only on the basis of 7½ gallons of water per horse power per hour, which has been the basis of figuring, but on a basis of 30 pounds evaporation of water per horse power per hour. Injectors are shown with flanged as well as screwed connections and all forms of the company's Metropolitan injectors are shown in dimension diagrams, so that piping may be laid out from the data given. Descriptions are also given of new forms of ejectors, hot water heaters and special injector fittings.

SULPHUR AND PHOSPHORUS RESULTS ON A SAMPLE OF PIG IRON.

TO THE EDITOR:

A pig of Dunbar iron was broken, one-half dressed and borings taken from it with a magnet were thoroughly mixed. By a process of sieving the finest and coarsest borings were discarded and only those of uniform size kept. These were mixed again and picked over with a magnet. Portions of this sample were sent to well known chemists of various iron and steel companies, with the request that they run it for sulphur and phosphorus, giving the methods used. My idea was not to make a standard iron but to note the differences in the results and methods.

With regard to pig iron standards, this one is all right for this special quality of iron, but would hardly do as a standard for some other kind of iron. No attempt was made to show off the quality of the Dunbar iron, as a sample was picked containing moderately high sulphur and phosphorus. My analysis of the sample was as follows: Sulphur, .052 per cent; phosphorus, .376 per cent; silicon, .93 per cent. The following table shows the work of each chemist and the method used:

Chemist.	Sulphur.	Method.	Phosphorus.	Method.
No. 1	.058	Aqua Regia	.4	Volumetric
	.050	Evolution		
No. 2	.054	Aqua Regia	.352	Magnesia
No. 3	.0468	Aqua Regia	.325	Yellow
	.0454	Aqua Regia	.328	Yellow
No. 4	.050	Evolution	.327	Yellow
No. 5	.050	Evolution	.385	Reductor
	.050	Aqua Regia		
No. 6	.044	Evolution	.342	Yellow
	.045	Evolution	.344	Yellow
No. 7	.049	Evolution	.356	Magnesia
No. 8	.048	Evolution	.350	Handy's
			.320	Reductor
No. 9	.046	Evolution	.350	Magnesia
	.048	Evolution	.350	Volumetric
	.047	Aqua Regia	.352	Volumetric
No. 10	.051	Evolution	.323	Reductor
	.053	Evolution	.326	Reductor
			.323	Reductor
			.332	Reductor
No. 11	.050	Evolution	.3766	Volumetric
	.050	Evolution	.3768	Volumetric
	.050	Evolution	.400	Yellow
	.053	Aqua Regia		
No. 12	.046	Evolution	.332	Handy's
			.330	Handy's
			.334	Handy's
			.332	Handy's
No. 13	.052	Evolution	.341	Yellow
	.052	Evolution	.337	Yellow

The results on sulphur are very good, while on phosphorus they vary considerably. The average sulphur, regardless of methods, was .0496 per cent; the average phosphorus, .350 per cent. The average sulphur by the "Aqua Regia" method was, .052 per cent; by the "Evolution" method, .049 per cent. The average phosphorus, by the "Magnesia" method was .352 per cent; by the "Volumetric" method, .355 per cent, and by weighing the "Yellow," .347 per cent.

The averages appear in the following:

Chemist.	Sulphur.	Phosphorus.
No. 1	.054	.4
No. 2	.054	.352
No. 3	.046	.327
No. 4	.050	.327
No. 5	.050	.385
No. 6	.045	.343
No. 7	.049	.356
No. 8	.048	.335
No. 9	.047	.350
No. 10	.052	.326
No. 11	.052	.388
No. 12	.046	.332
No. 13	.052	.339

No. 12, using "Handy's" method for phosphorus, got by adding molybdate at 85 degrees C., .332 per cent; at 70 degrees, C., .330 per cent; at 50 degrees C., .334 per cent. No. 5 got, .050 per cent sulphur by "Aqua Regia," also .050 per cent by evolution through a strong solution of permanganate and treatment of residue by "Aqua Regia" No. 1 shows quite a difference between the "Evolution" and "Aqua Regia" methods for sulphur, due probably to the Dunbar iron not being at all like the iron with which he worked. All the "Reductor" and "Volumetric" methods on phosphorus were either by "Emmerton's" method or a modification of it.

These results, while not remarkable, are certainly very good and well worth noting, especially the close agreement between the "Aqua Regia" and "Evolution" results on sulphur. The averages of the three methods on phosphorus are very close.

S. B. MARSHALL,
Dunbar, Pa. Chemist Dunbar Furnace Co.

LAKE SUPERIOR IRON MINES.

The board of equalization of St. Louis county, in which are located all the developed iron mines of Minnesota, met at Duluth last week to adjust finally the appraisement of non-shipping mines. W. J. Olcott, representing the Lake Superior Consolidated Iron Mines, argued that it was entirely fair that the shipping mines should largely carry the burden of taxation on mines, since other properties were yielding nothing with which to pay taxes. The schedule as agreed upon for the 30 non-shipping properties in St. Louis county, gives a total of $576,765, against $499,357 as fixed by assessors, and $695,460, as shown on the tax duplicate of 1896. Among valuations reduced are those of the McKinley, from $60,000 to $40,000; Zenith, from $32,200 to $30,000; Iron Chief, from $30,000 to $20,000; Hale from $19,500 to $9,500; Sauntry, from $60,000 to $40,000; the Elba, from $15,000 to $6,000; Shaw, from $40,000 to $20,000; Great Western, from $30,000 to $10,000; Rouchleau, 17-58-17, from $60,000 to $40,000; the Vega, from $74,280 to $10,000. The Miller-Brown property, "Section 26," was raised from $210 to $30,000; the Pillsbury, from $30,000 to $75,000. Ore under the Eveleth town site is assessed for the first time, the figure being $10,000. The deposit is so valuable that preparations are being made to move part of the town off the town site, so that the mine may be worked.

The programme for the fifth annual meeting of the Lake Superior Mining Institute to be held at Ironwood, Mich., Aug. 16, 17 and 18, has just been issued. The committees appointed by members on the Gogebic range are the following: Transportation—Irwin Sutherland, Ironwood; J. T. Bawden, Wakefield; J. R. Thompson, Ironwood; P. L. Ramquist, Bessemer. Arrangements—T. F. Cole, Ironwood; Geo. H. Abeel, Ironwood; Jas. Piper, Bessemer; L. E. Dunham, Ashland. Reception—E. D. Nelson, Ironwood; J. H. Taylor, Ironwood; Wm. I. Prince, Bessemer. The members are expected to assemble at Ironwood, Tuesday morning, Aug. 16, leaving at 9 o'clock by train for Wakefield. Thence the train goes to Bessemer for inspection of mines. After lunch at Ironwood the afternoon will be spent in visiting the Newport, Pabst, Aurora, East Norrie, Norrie and Ashland mines. An evening meeting for the reading of papers will be held in the armory at Ironwood. Wednesday's itinerary includes visits to the Shores, Iron Belt, Atlantic and Montreal mines. An evening meeting will be held. Friday forenoon a trip will be made to Ashland Furnace. From Ashland boat will be taken to Bayfield and the afternoon will be spent in a trip on the boat around the bay and islands. Trains will be taken from Ashland in the evening.

A considerable net increase in the valuations of shipping mines on the Vermilion and Mesabi ranges was made by the board of equalization of St. Louis county, Minn., though in some cases there are reductions from the figures of 1896. Of Vermilion range mines, Chandler and Pioneer are substantially as before—$416,250 and $166,500 respectively. The Minnesota is reduced from $390,300 in 1896 to $305,250. Fayal (including Fowler), is increased from $207,630 to $416,250; Oliver and Lone Jack each from $93,000 to $111,000; Adams from $209,100 to $222,000; Genoa from $45,000 to $222,000; Sparta, from $15,000 to $138,750; Mountain Iron, from $229,500 to $416,205; Mahoning, from $186,041 to $416,250; Lake Superior, from $195,582 to $222,000. Canton is reduced from $105,582 to $27,750; Auburn, from $161,400 to $111,000. The Commodore is put in at $55,500; Ohio at $83,250; Franklin, at $69,375, reduced from $91,400; Bessemer at $69,375; Norman at $55,500; Duluth at $83,250; Sellers at $83,250; Penobscot at $44,450; Victoria at $27,750.

Under the terms of the new lease given by the fee owners of the Pioneer mine to the Pioneer Iron Co., in which the Oliver Iron Mining Co. now has a controlling interest, no ore is required to be mined this year. The lease is extended for 50 years. Additional details concerning the terms of the new arrangement are thus given in Duluth dispatches: The royalty to be paid is 33 cents a ton. No bonus has been provided for. The fee owners have been holding out for the payment of $300,000 as a consideration for the extension of the lease, but they have accepted in lieu of it a minimum annual output of 500,000 tons. This means the payment to the fee holders of at least $165,000 annually. Under the old lease the fee owners received 50 cents a ton on the first 50,000 tons, 40 cents for all up to 75,000 tons, and any amount mined over and above that figure 35 cents a ton. It is intimated that a reduction from the $1 freight rate from Ely to Two Harbors will be secured by the new lessees.

Review of the Technical Press.

BY DR. RICHARD MOLDENKE.

The Dissolving Power of Iron and Steel. [*Stahl und Eisen*, 11, 12, 13.]—Baron von Jueptner read a paper before the Iron and Steel Institute at its May meeting, in which he contributed some interesting data on the above subject. It is coming to be generally understood at the present time that steel and iron are practically solutions which are in a frozen state at ordinary temperatures. Any light thrown upon the laws governing the solvent action of the metals, therefore, will be of great value to us. Pure iron can dissolve 40 % of its weight of carbon when at 8,330° F., 1.5% when at 1,880° F., and 0.9 % when at 1,370° F. The presence of manganese increases the dissolving power of iron, while silicon diminishes it. Baron Jueptner made it his object to find out to what extent this is the case. Percy's investigations show that the maximum total carbon in pure pig irons may run up to 4 63%, any greater quantity held in solution while the iron is fluid separating out as "kish." Manganese and chromium increase this considerably, a ferromanganese, according to Ledebur, running up to 7.5% carbon, while ferrochrome may run up to 7.8% carbon. An interesting series of calculations based upon a number of recorded anyalyses gives the saturation point of manganese with carbon, independent of the iron, as 1.6 times that of iron, and chromium with carbon as 2.4 times that of iron with carbon. In other words the affinity for carbon of iron, manganese, and chromium, would be as 1:1.6:2.4. The melting points of the alloys of iron and steel are naturally lowered by the addition of the dissolved substances. The melting point of pure iron is taken at 2730° F. (according to Osmond).

Concerning the latent heat of pure iron while melting, there are no data at hand. For pig iron, however, some determinations have been made. Compared with the latent heat of melting steel that of a white pig iron and a gray one are as 30:23:33. The melting point of manganese is taken at 3450° F. Now come some tables giving calculated melting points of various combinations of iron with manganese, the actual melting points of alloys having in addition various amounts of carbon and silicon, and a regrouping of results to show the consequent reductions in the melting points, the number of atoms in the molecules, and finally the avarage size of the molecules of the dissolved carbon and silicon. The conclusions drawn from these tables are that in the absence of silicon and manganese, the molecules of dissolved carbon probably consist of three atoms. As the silicon contents rise the size of the carbon and silicon molecules increases. The same is the case with an increasing manganese contents.

Next comes an attempt to calculate the absolute dimensions of dissolved molecules of silicon and carbon. This, while exceedingly interesting, suffers from the lack of correct melting points, but this much seems to have been determined with some degree of certainty, that the molecules of carbon and silicon dissolved in pure iron correspond to C_3 and Si_7. Again, further investigation shows that the size of the molecules of dissolved silicon seem to increase more rapidly than those of carbon when the manganese contents rises. The calculation of the melting point of an iron can so far only be undertaken for metals free from manganese, for the size of the molecules of carbon dissolved in manganese are as yet unknown quantities. There follows a series of elaborate calculations of the osmotic pressures of various kinds of irons; that is, their diffusive powers when melted. It was noticed that this power to diffuse and make good uniform mixtures decreased considerably as the silicon contents went up. This question of osmotic pressures is interesting, as it forms the basis of much of the trouble in the foundry. Thus the osmotic pressure of a one per cent carbon solution in iron compared with that of a one per cent silicon solution in iron is as 5.41 is to 1, in other words carbon will diffuse very much more readily in iron than silicon. One important point to be noted here is that with the molecular weight of C_3 and Si_7 running as 1 to 5.44, the osmotic pressures of equal weights of carbon and silicon are inversely as their molecular weights.

Incidentally, Baron Jueptner gives some information regarding the increasing volume of iron when melted, and its specific gravity, at this point. The increase is 6.6%, and the specific gravity is 7.4. If we consider iron rich in carbon a concentrated solution of carbon in iron, and allow it to cool slowly, graphite separates out, some of it as kish which comes up to the surface, another portion diffuses equally in the iron, and other portions again group in local spots due to segregation. During a very slight interval of temperature below this point, there occurs a sudden change in volume on the part of the metal, accompanied with enormous internal strains which give rise to conditions favorable to the formation of diamonds. At the temperature of about 1,900° F., only 1.5% of combined carbon can remain in the iron, 3.13% being separated out as graphite. Since at 1370° F. there can remain only .90% combined carbon, corresponding to $Fe_{24}C$, the balance must have again separated, but in this case as Fe_3C. At the same time the phosphides of iron and manganese also separate out in a finely granular condition. Below this temperature further changes in the structure of the carbide of iron take place, which are well brought out by the microscope. One point does not seem to be well understood, and that is what occurs between the time that graphite separates out and the carbide of iron appears. Baron Jueptner concludes the paper with a series of calculations of the size of the molecules of the various iron carbides as they occur in numerous steels.

Pennsylvania's Iron and Steel Output in 1897.

The annual report of James M. Clark, chief of the bureau of statistics of Pennsylvania, gives some facts relative to iron and steel production in that State last year. The production of pig iron was 4,617,634 gross tons, an increase over the previous year of 591,284. The value was $48,884,854, an increase of $3,712,815. The aggregate cost of basic material from which this pig iron was made, that is only the iron ore and scrap or cinder, if any were used, was $29,992,533, as against $26,251,420 the previous year. The average cost per ton of this raw material was $6.48, or four cents less than in the preceding year. The total production of open-hearth steel for the year was 1,421,373 gross tons; Bessemer, 2,586,278 gross tons; crucible, 9,245 gross tons; combined production, 4,056,896 gross tons, an increase of 71,367 gross tons over the previous year.

The output of rolled finished products was 4 714,333 net tons, much beyond previous records, and 957,256 net tons increase over 1896. This production was classified as follows: Iron and steel bars, rods, bolts, hoops, skelp, rolled axles, shapes and structural iron, 2,813,898 tons; sheets and plates, except nail plate, 759,468 tons; cut nails and nail plate, 50,606 tons; iron and steel rails, 1,090,341 tons. The aggregate value of this finished material is put down at $123,900,771, an increase of $4,871,009 over the aggregate for 1896, but a material shrinkage in value, the average per ton in 1896 being $31.68, and in 1897, only $26.

There were 15 black plate works in operation in the State last year in the manufacture of tin plate. The capital invested was $5,017,127, an increase of $1,389,852 over the previous year. The entire production of black plate, tinned and untinned, was 254,157,601 pounds, an increase of 95,851,111 pounds over 1896. These works tinned of this black plate product 179,705,766 pounds, an increase of 83.7 per cent. The value of the entire production of the black plate works, tinned and untinned, was $6,837,921, an increase of $2,200,100 over 1896. The average number of days in operation was 281; number of working people employed, 3,920; aggregate amount of wages paid, $2,227,217; average yearly earnings, $586.17; average daily wages, $2.02. In addition to these 15 tin plate works manufacturing their own black plate and making tin plate from the billet or bar, there were 11 dipping works in operation, with a production of 45,926,000 pounds of tin and terne plate, all from black plate and rolled in the United States, and corresponding value of $1,816,417.

Of Pennsylvania's steel output, Allegheny county produced 69 per cent, and of pig iron nearly 58 per cent. Of iron and steel rolled into finished form the county produced over 54 per cent.

THE McDowell semi-steel process, controlled by Hanson McDowell, 1522 Monadnock Block, Chicago, has been adopted by the Rarig Engineering Works, of Columbus, O. The McDowell process is in use in several of the largest foundries of the country, and is meeting with much success.

IRON AND STEEL MAKING AT MARQUETTE.—I.

BY JOHN BIRKINBINE.

[In several issues of *The Iron Trade Review* in 1892, articles appeared, written by Richard A. Parker, then of Marquette, on the economies of iron and steel manufacture at Marquette, Mich. The report of Mr. Birkinbine, of which the first installment is given below, is based upon more recent investigations, but agrees with Mr. Parker's report, to which it refers, on the main proposition. Mr. Birkinbine's report is addressed to J. M. Longyear, of Marquette, at whose instance the investigation was conducted.—ED.]

Historical.

The initial exploitation, made about 40 years ago, of the magnificent iron ore deposits of what is now recognized as the "Marquette Iron Range" (most of the deelvopments being within 15 miles of Marquette), is credited to local forges and blast furnaces, and more than a score of plants have been erected on the Northern Peninsula of Michigan to smelt the ores from the Marquette, or the Menominee range, with charcoal obtained from the neighboring forests, and to a limited extent, with mineral fuel brought from the lower lakes by vessels. The production of pig iron, at Marquette and vicinity, cannot, in view of this history, be considered an experiment, and the possible expansion of iron manufacture in that vicinity, has also been covered by previous reports. Any discussion of these subjects must, therefore, take into account the results of earlier efforts at iron production and the conclusions of other investigators.

The present status of the blast furnaces in the Northern Peninsula of Michigan suggests that the industry has not proven successful, although some of the plants have paid a handsome return to the owners. There are seven charcoal blast furnaces which may be considered on the active list in the Upper Peninsula, three of which were producing iron in the year 1897. In 1896 the Upper Peninsula contributed 42,000 tons of pig iron, out of a total for the State of Michigan of 147,000 tons, and in 1897 the same district supplied 57,219 tons, the entire State of Michigan being credited with 126,113 tons; all of this metal is made with charcoal.

An examination such as you have committed to me, therefore, starts with some apparently adverse conditions to be explained; although a study of the history of the plant satisfactorily accounts for those which have been abandoned. The furnaces which were first constructed were mostly located to utilize water-powers, and were of moderate capacity, the ores and fuel being conveyed to them, and the pig iron taken from them by wagons. These plants could not meet the competition of furnaces constructed after railroads were built and so situated as to utilize this improved transportation. As the denudation of the timbered areas decreased the reliability of the water-powers, and also added to the expense of obtaining charcoal by wagon-haul, old furnace sites were abandoned for more favorable locations, or operations were suspended.

But some of the more modern charcoal blast furnaces, now idle were not located to the best advantage, and expenditures upon their construction, or their appurtenances have, in specific cases, practically crippled successful iron manufacture. The Grace Furnace, erected 25 years ago at Marquette to use mineral fuel, also proved to be unsuccessful under the then existing conditions, and does not offer encouragement now to expect profitable operation from a plant of its capacity and equipment. In addition, the Upper Peninsula has had its share of enterprise established or attempted to be operated with inadequate capital. The history of pig iron production in the United States demonstrates that the abandonment of blast furnaces, or the changes of location are not peculiar to the district under consideration, and this is especially true of plants dependent upon charcoal for fuel. In all sections of the country where pig iron has been produced for 20 years or more, the number of abandoned furnaces is noticeable; in some localities exceeding the number of active plants.

The fact that but moderate success has attended the manufacture of charcoal pig iron close to Lake Superior should not act as a discouragement for considering future enterprises, but should rather stimulate a study of the causes and the possibility of overcoming the troubles.

Scope of the Investigation.

The report of a committee presented to the Board of Trade of Marquette on Oct. 16, 1890, and also the papers upon coke iron making on Lake Superior contributed by Mr. Richard A. Parker, M. E., in 1893, have been critically read; in addition, the data which I collected for a report for the Board of Trade at Duluth, Minn., in 1887, have been reviewed, and the information obtained in a number of visits to the Lake Superior region within the last decade has been utilized in the following memoranda. In discussing the advantages or disadvantages of Marquette for iron and steel manufacture, the features, considered in a general way, will be:

A. The facilities for obtaining raw materials, viz., iron ores, fuel and flux, and the character of metal which can be produced advantageously.

B. The market which may be conveniently reached, or developed, and the character of products most in demand.

C. The existing or prospective transportation facilities and rates obtainable on raw material and finished product.

D. The supply and cost of labor and of provisions.

E. The relation which the location bears to other established works which make similar products, and the competition which must be met.

F. The character of works which should be constructed, and the relative expense of producing and manufacturing iron and steel in them and in works elsewhere.

In addition, the possibilities of future advances in other localities which are not at present competitors demands attention.

In good practice the amount of ores required to produce a ton of pig iron will exceed the weight of fuel and flux necessary for smelting them; and in a general way it would appear better policy to convey the fuel and flux to the ore. But transportation facilities, a market, and ample, cheap labor are necessary to insure success, and the location of a plant will be influenced by conditions affecting each special feature.

The examination which has been made indicates two courses practicable at Marquette.

1st: The manufacture of charcoal pig iron of special character, in limited quantity, which will command what are considered "fancy prices," and the conversion of all, or a part of the metal produced, into finished shapes.

2nd: The production of pig iron with mineral fuel, on a relatively large scale and the manufacture of this metal, as far as possible, into iron or steel of varied forms, for general use.

There does not now appear to be any alternative plan inviting detailed investigation. Understanding that the desire is that the discussion should be confined to the use of mineral fuel, no further attention will be given to charcoal pig iron; and this report will treat of the opportunities which Marquette apparently offers, or the disadvantages which must be met there.

A. In the production of pig iron using local ores and coke obtained from bituminous coal.

B. In the manufacture of pig iron so produced into iron and steel of forms for commercial use.

C. The market for the manufactured material.

Any such industry established at Marquette, upon a small scale, would present few features which would be considered essential for successful existence, and the conclusions will be based upon a plant having sufficient capacity to maintain its own shipping facilities, or to encourage its trade to be sought for by competing transportation companies.

The Ore Supply.

Undoubtedly the most potent influence in reducing the cost of pig iron in the United States has been a development of the iron ore deposits of the Lake Superior region. The excellent qualities and immense quantities of these ores, obtained from a section far removed from a satisfactory mineral fuel supply, encouraged economic methods of mining, handling, and transporting the product of the mines, which are recognized as models throughout the metallurgical world. These economies have made it possible to deliver ores at furnaces several hundred miles inland from the shores of the lower lakes, at rates which permit of their use in preference to local supplies of less desirable ore.

The liberal scale upon which the Lake Superior iron ore

mines are exploited, the special equipment of railroads which haul the ore to the shipping docks, the facilities for loading and unloading modern vessels of large tonnage, the character of the vessels in use, etc., contribute to reduce the cost of ores from the Marquette and other ranges in the Lake Superior Region, delivered at blast furnaces in Pennsylvania, Ohio and elsewhere. The low cost is largely due to the quantities of ore mined, handled and shipped, and the reduced expense of producing pig iron is also influenced by the augmented capacities of blast furnaces smelting these ores. Hence the natural advantages of Marquette, as the site for the establishment of an iron industry have been discounted, for the furnaces to which these ores are forwarded will compete with any iron producing plant at Marquette, and future advances in shipping, handling and transportation facilities will maintain this competition.

But the greater part of the Lake Superior ores are carried to furnaces to which mineral fuel must also be brought, the average distance of these iron works from the fuel supply being greater than the distance from Marquette to present developments of excellent iron ores. That is, most of the furnaces using Lake Superior ores must not only transport their ores but also their coke over considerable distances; but many are close to market facilites for their product. The rapid development of the portion of our country which is tributary to or can be easily reached from the Great Lakes may divert part of the future iron production from Pittsburg, Chicago, or other centers to points nearer the ore fields, and yet not beyond cheap transportation for the fuel. Whether this fuel will be transported in its raw state and coked at the blast furnaces, or whether it will be conveyed as coke, is a problem in process of solution.

Large Producing Capacity Necessary.

To meet competition from works of large capacity a plant must produce liberally, and to enter the list with well-managed industries having strong financial backing, ample capitalization, and the application of technical knowledge will be necessary. Notwithstanding the new plants which have been added, the total number of blast furnaces smelting iron ores is decreasing, while the output of pig iron is increasing, for the recent constructions are of larger proportions, or of superior equipment, to those which are relegated to the past; and many of the existing plants are managed with skill, resulting from a careful study of the technical and physical conditions affecting the smelting process.

A necessity of economical and successful steel manufacture, especially in the Bessemer process, appears to be the production of large quantities. This permits labor-saving appliances, and a reduction of fuel consumption to a minimum, and encourages the concentration of blast furnaces of large aggregate capacity in the vicinity of steel works where the direct method of conveying the molten metal from the blast furnaces to the convertor further increases the economy of the plant. As a consequence enormous pig iron producing capacities center about the steel plants of the country, and these great industries have the advantage of buying raw materials in quantities, of employing the highest skill, and of making use of the most approved appliances.

The production of steel by the open-hearth process admits of the use of small units which, multiplied, may demand as great quantities of metal as the Bessemer process, and equally encourage labor and fuel economies. When the practices of our great steel works are compared with the older methods, we understand why steel rails cost less than iron rails, or why steel plates undersell standard brands of plate iron. In these modern plants the cold iron ore, fuel and flux enter the furnace, and the cold, or nearly cold finished rail or plate is handled at the shears, drill, press or punch, but at no intermediate point in the manufacture is the metal produced cold or allowed to fall below a temperature for convenient manipulation in rolls or under hammers.

Transportation Facilities.

The advantage of abundant ores of various grades and composition, but of generally excellent quality, obtained close to Marquette has been offset by the distances over which fuel must be conveyed to the ore and the comparatively limited facilities for distributing the product of the furnaces in the winter season.

During the season of navigation, Buffalo, Cleveland, Toledo, Detroit, Chicago, Milwaukee, Marquette, Duluth, and other prominent shipping ports of the Great Lakes, all have the advantage of the present excellent waterways and the cheap transportation which these great connected bodies of water offer. The rapid increase in the number and size, and improvements in construction and equipment of the lake marine, the deepening of connecting channels, the enlargement of locks, and the advance in handling and shipping appliances at lake ports, augurs favorably for even better water transportation facilities.

Marquette, while not laying claim to being a railroad center, may possess facilities for competitive land transportation, by means of connection with the two roads which now contend for the traffic between the ore mines and Marquette, one of these roads, the Duluth, South Shore & Atlantic Railroad, connects with Eastern roads at St. Ignace and Sault Ste. Marie, and with Western roads at Duluth and other points. It also connects, nearer to Marquette, with the two great systems of the Chicago & North Western, and the Chicago, Milwaukee & St. Paul railroads. The Lake Superior & Ishpeming Railroad can also be connected with these two systems, by extensions from 15 to 30 miles long; distances which would present slight discouragement when large tonnage was to be commanded.

The future may bring, in the way of electro-metallurgy, or in possible direct processes, methods which will reduce the cost, or simplify the production of iron and steel; but, in the light of present knowledge, it is necessary to assemble ores, flux and suitable fuel for smelting the ores at a common point to obtain satisfactory commercial operation in a blast furnace plant, and the relative advantages of Marquette and other locations depend upon the facilities for such assembling and for marketing the metal produced. In 1891, a comparison was made of the cost of producing iron in four prominent districts, taking, in each, blast furnaces of nearly similar dimensions, well located, managed and equipped. The relative cost of the different items showed that the expense for fuel, per ton of pig iron of similar character and grade made was then lowest at Pittsburg and highest at Chicago, whereas the cost of ore per ton of pig was lowest in Alabama, the highest at Pittsburg. Labor per ton of product, however, was reported highest in the Birmingham district and was lowest in the Pittsburg and Chicago districts. The latter item was largely influenced by the relative quantities of raw materials handled and the output of the furnaces. It is probable that at the present time the comparative items would hold nearly the same relations as in 1891.

The committee which reported on coke iron manufacture to the Marquette Board of Trade in October, 1890, states that "the question of an economical production of pig iron and the uses to which it may be put, is naturally dependent upon the facility with which the several raw materials entering into its construction can be assembled; that location will be the better which enables them to be gathered at what may be termed the center of gravity of material. A location that can gather its heavier material with lighter freight charge will be the better in the proportion of these heavier elements to the lighter ones, having due regard to the distributing of the products by rail or water."

This is undoubtedly true, as far as the mere production of iron is concerned, but the problem is not merely to produce cheaply, but to market the product satisfactorily. There will be no difficulty in demonstrating that by assembling raw materials with existing facilities, the expense of producing a ton of pig iron at Marquette, from local ores, with fuel brought from the lower lakes, will be less than the cost of producing similar iron at Cleveland, Buffalo, Chicago, etc., using the same fuel and Marquette Range ores.

The reason for this is that the bulk of the present and prospective lake traffic being eastward, freights from Lake Superior ports to the lower lakes are and will continue higher than those from the lower lake ports to Lake Superior ports, also that less fuel than ore is required to produce pig iron.

THE water works for the new Eliza furnaces of Laughlin & Co., Ltd., at Pittsburg, will have a capacity of 20,000,000 gallons per day. The contract for engines has been awarded the Wilson-Snyder Mfg. Co., of Pittsburg.

WIRE WORKS WAGE SCALES.

The closing down of the American Steel & Wire Co.'s Anderson, Ind., plant because the men refused to accept recent reductions in wages has been followed by a walk-out in the wire departments of what were formerly the HP Nail Co. and American Wire Co. plants in Cleveland. The Federated Wire Trades Union appointed a committee to confer with Manager Shuler of the Cleveland mills to protest against a reported impending reduction of 20 per cent, in addition to that made when the American Steel & Wire Co. took hold of the plants last spring, and to arrange a scale on behalf of the union. The management refused to confer with a committee representing anybody other than their employes, and said that no further reductions were to be made. Thereupon, employes in the wire departments of the two mills went out. The rod mill men remained at work. At the third Cleveland plant, that of the old Consolidated Steel & Wire Co., the men, being non-union, remained at work. The strikers claim that all the Cleveland plants will be made idle by the extension of the strike.

Wire Mill Wage Scales Compared.

For the light it throws upon the new wage system of the wire consoliation, as compared with that of its principal competitor, we give the following statement from General Manager Shuler:

"The American Steel & Wire Co. came into existence April 1 by purchasing a number of mills throughout the country, including three in Cleveland. At that time there were various scales being paid throughout the different mills. In order to get on a common level, the committee that had the matter in charge arrived at an average scale for the coarse wire departments of the mills in this district. This scale was somewhat lower in some respects at the American and HP mills, but was higher than the scale then being paid at the Consolidated mill. Consequently, there was a reduction at the first two named mills and an advance at the latter mill, in order to have all on the same basis. At the time this scale was adopted the men were told that the scale was final and the company had no intention of changing it. That stands today, and the company has no intention whatever of altering the scale then adopted. This scale was put into effect at the mills starting in April. At that time the committee was not prepared to present a scale for the fine wire drawers at the American mill. Hence, that department was started on the then existing scale, but the men were told that as soon as the scale was revised it would be inaugurated. That was done on July 1, which scale is now in force. There has only been the one adjustment of scales for each department, and not two or three, as claimed by some outsiders. This readjustment was necessary in order to put all of the mills on the same basis, giving each one the same benefits as the others.

"I notice that a newspaper states that the coarse wire drawers averaged $2 25 a day before the American Steel & Wire Co. came into existence; that now their wages are from 80 cents to $2 a day. Our records for the last two weeks in July show that the inferior men have earned from $2.10 to $2.50 per day, while others have earned more. During the same time our wet wire men have averaged $2 53 per day for each man.

"In reference to our cleaning department, the same newspaper states the employes are making but 90 cents a day. Our records show that the lowest price formerly paid there by the old company was $1.37 per day. We have changed the system and manner of handling that department, with the result that these same men are able to earn $1.64 a day, and can do it as easily as they formerly did by the old way. This is for 10½ hours' work and not 12, as claimed.

"In our fine wire department the men for a certain time, when the old company was in existence, averaged $2 99 per day on 24 blocks. Our company changed the system so that each man was given 32 blocks. His earnings can now be as much as before without any harder work or more time.

"We will make a few comparisons between the present scale at our American mill and the Washburn & Moen Mfg. Co., who are our strongest competitors, and against whom we are compelled to compete in all markets. The Washburn & Moen people in their fine wire department employ principally girls, giving each one a frame consisting of forty blocks. They then have one man to hammer the dies for three frames, or 120 blocks. So that there they employ one man and three girls, we employ whree men, and it is now understood that they contemplate having the girls hammer their own dies, which will do away with the man entirely. If we were to adopt this system, we would have to lay off two wire drawers out of every three, and replace them with girls. This, however, we do not contemplate doing. Their fine wire drawers do not average over $10 to $12 per week. On the same conditions, and with the present rates, our scale is 26½ per cent higher than theirs.

"Comparing our coarse wire drawers with these same competitors, shows that our scale is 45 per cent higher than theirs. In the coppered wire department, our scale is 44½ per cent higher. We could go down the line in the same way, showing that the scale that we are at present paying in our American mill is considerably higher than for similar work that is being done in the mills of our competitors. We are constantly making changes in our mills, so that the facilities are the best. This gives our men every advantage and enables them to get out as large a production as any other mill in the country. We are compelled to compete in the open market, which we have been doing with a wage scale that is higher than our strongest competitors have been paying. We wish to repeat that there has been but one readjustment in each department, and that no second one is, nor was contemplated by the company. We expect to operate our mills, and will do so, on the system as laid out.

"As for the statement that the other nail mills are making war on the American Steel & Wire Co. by cutting the price of nails from $1.43 to $1.33 per keg, they do not seem to know that the price to jobbers has been for some time $1.25 per keg.

"In comparing the present price of nails with the lowest price on record, which was several years ago, when nails were selling at 85 cents base per keg on the old nail card, at that time, the average mill advance was 65 cents, making the total average price received for a keg of nails $1.50. Whereas, today, at $1.25 base on the present nail card, the mill average advance is only 13 cents, making the total average cost for a keg of nails to the purchaser $1.38, which is 12 cents less than it was ever known to be."

The Employes' Statement.

The committee of the Federated Wire Trades Union, replying to Manager Shuler's statement, says in substance: "The readjustment referred to was made by taking 20 per cent away from two mills and giving 5 per cent advance to one mill. The cleaners were reduced from $1.45 a day to $1.25 a day when the American Steel & Wire mill took control, and since have been put on piece work. The $1.64 wage referred to by Mr. Shuler can be earned only by cleaning 100 tons a day. When this was attempted workmen were frequently taken away overcome by heat, steam and acid. Sixty tons is about the regular run. In the coarse wire department it is denied that $2.10 to $2.50 is average pay. On some jobs a record of $1.50 is exceptional and on others $1.10 to $1.20 is the rule, the majority of the workmen in this department being among the oldest in the company's employ. Admitting that the fine wire drawers did average $2.99 on 24 blocks does not necessarily carry with it the admittance that 32 blocks are just as easily run as 24, nor does it prove that a 35 per cent cut in wages is a bonanza." The 40 blocks run by girls in the Washburn & Moen mills are run at less than half the speed of blocks in Cleveland mills. "The Washburn & Moen mills pay 92 cents per 100 pounds, for size 33, and pay diemakers besides, and the American Steel & Wire Co. propose to pay 92 7/8 cents and have the men make their own dies. The girls produce nearly one-half scrap wire, and we are allowed three pounds to the 100. The Washburn & Moen Co. have been trying to rid themselves of girl labor for some time, but cannot secure competent labor at prices offered. Admitting that the Washburn & Moen coarse wire scale is lower than here, yet it is no lower than when the old HP and American companies were paying 20 per cent higher wages than we are now asking of this corporation."

The men say, in conclusion, that they have reliable information that a scale has been drawn in the Cleveland district office that contemplates a further reduction of 20 per cent; that the scale had been posted at Rankin, Pa., but was taken down on the beginning of the trouble at the Anderson, Ind., mills.

DUPLEX AIR COMPRESSOR.

A type of air compressor recently furnished a number of coal mining companies in the Connellsville and other Western Pennsylvania districts is shown in the illustration. The particular outfit of which a view is given was built for the Youghiogheny Mining Co., by the Laidlaw-Dunn-Gordon Co., of Cincinnati. It is known as the Cincinnati company's 18x20x24 duplex crank and fly-wheel air compressor. Special attention has been given in its construction to strength and rigidity in engine parts, and metal has not been spared, where larger sections would add to the life and efficiency of the engine. Stress is laid, also, upon the improved water jackets provided for the air cylinders, these serving to keep the air at a temperature lower than is ordinarily attained.

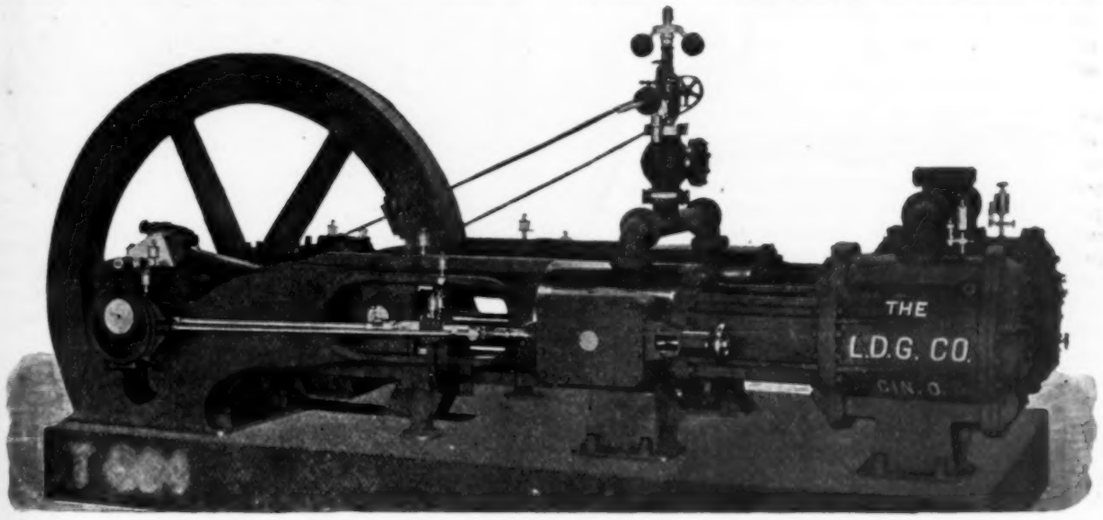
The steam cylinders have heavy feet cast upon them, these resting upon the foundation and giving support directly under the cylinders. The steam chests are cast on the cylinders. The steam and exhaust ports are made very large, to permit of high piston speed when necessary. The steam pistons are of cast iron, with head and followers, and fitted with improved metallic packing. The cross-heads are made of cast iron and planed off to receive adjustable shoes, the latter being fitted to the cross-heads on an incline. The crank shaft is forged out of mild steel, the cranks being forged solid and cut out to form crank pins. The main frames are of strong cast iron and made especially heavy to stand severe service. The ends of frames are recessed to fit over projections on the steam cylinders, bringing the bore of the steam cylinders and the bore of the guides in perfect alignment. The feet are cast on the frames directly under the main bearings and are extended down to the same line as the feet on the steam cylinders. Forked on the crank shaft ends, the frames form bearings, on either side of each crank. Feet are fitted under the center of the frames extending down to the foundation, to prevent any possibility of the frames springing in the center. The cut-off valves are adjusted by hand-wheels, secured to brass sleeves on cut-off valve rods. The inside of the outer ends of the sleeves is made square to fit the squares formed on the valve rods. Square threads are cut on the center of these valve rods to fit the brass nuts between the lugs of cut-off valves. Threads are chased on the outside of the bushes to carry the index, which shows the point of cut-off.

The governor combines the fly ball and pressure types. While the ball portion prevents the machine from running beyond the maximum speed, the air cylinder on the governor shuts the steam off when the desired pressure is reached. The fly wheel is built extra heavy and is made in halves, secured to the crank shaft with heavy bolts at the center and held together at the rim by bolts and links which are shrunk on flush with the outsides of the wheel.

The air cylinders are made of close grained cast iron and have jackets cast on them with ribs between the inner and outer walls of cylinders so arranged as to give perfect circulation to the cooling water. The suction passages are cast on the lower part and the discharge passages on the upper part of the cylinders. Heavy feet are also cast on the cylinders to extend down to the foundation in a line with the feet of the steam cylinders and frames. The suction passages are arranged to take the air from outside the building or any other cool place. Suction valves of bronze are provided. They are hollow cylinders, ribbed on the inside so as to make them strong and avoid and possibility of breaking, as with stem valves. Bronze nuts screwed on the outer ends of the valves are adjusted so as to limit the lift, being secured to the valves by taper split pins.

Air discharge valves are made of steel out of the solid bar and are cut out on the inside to make them light and to hold the cylindrical spring. The valve seats are of bronze and besides forming the seats, they form the guide for the valves. They are fitted with plugs in their outer ends, with projections on the plugs to extend down and limit the lift of the valves. These plugs also answer as guides for the springs. The discharge seats may be taken out without removing the heads, by removing the plugs in the head.

Air cylinder heads are made of cast iron, with stuffing boxes for piston rods in them. The suction and discharge valve seats are screwed into these heads and can be reached without removing the heads. The suction valves can be reached by removing the plate which covers the chamber in which the valves are located. Inside the heads are fitted with thin steel plates which fit into the counterbore of the cylinders, and are secured to the heads by screws, the heads of which are riveted into a square counter sink in the plates. These plates prevent the valves from getting into the cylinders, if anything should work loose about them. The thin steel plates are perforated opposite the suction and discharge valves to allow the air to pass freely through them.



DUPLEX AIR COMPRESSOR.

These compressors are manufactured at the Tweedvale works of the Laidlaw-Dunn-Gordon Co., noteworthy for their large output of pumping machinery. Martin C. Baker, 30 S. Water st., Cleveland, will furnish descriptive literature on application.

EDGAR ISENGART, a head roller in the mill of A. M. Byers & Co., South Side, Pittsburg, has devised a machine operated by hydraulic pressure, for the purpose of preventing the breaking of rolls. When a piece of hot metal sticks in the rolls, a valve is opened and the mechanism set in motion, spreading the rolls so that the piece passes through.

FORSTER, WATERBURY & Co., 636-638 The Rookery, Chicago, sales agents of the Iroquois Furnace Co., have taken the sales agency for the Puritan coke, a high grade coke made in theheart of the Connellsville district. They carry a stock of the coke in Chicago, enabling them to make prompt delivery at all times.

IMPROVED SLOTTING MACHINE.

A machine which is an improvement upon the Colburn key-seater, the modifications adapting it specially to working out slots, has been brought out recently by Baker Bros., of Toledo, O. In Fig. 1, for which credit is due the *American Machinist*, a general view is given, and a piece of work is shown, whose long cross slots have been made by the machine. Instead of the hand feed of the regular key-seater, an automatic feed has been provided for the table of this machine, with provision for a withdrawal movement of the work, on the ascending stroke of the tool.

Upon the pinion shaft and behind the slotted disk *A*, Fig. 2, is a rocking arm *B* with three projections. The lower *a* of these projections extends out under the slotted disk and up in front of it, and when struck by one or the other of the shipping studs or dogs on the face of the disk the rocking arm *B* is moved simultaneously with the shipper. The longest projection *b* of this arm, extending horizontally to the left is slotted for the purpose of adjusting the feed, which thereby may be made to take from one to three notches on the pinion above. The connection to the feed screw is clearly shown in Fig. 1. From the third projection *c* of the rocking arm extends the vertical connection *l* to the lever *k*, and from the other end of the lever *k* the short connection *j* attaches to the center pin of the toggle joint *i i*. One end of this toggle is attached to a fixed lug on the frame, and the other end to a lug upon the horizontal table slide, and a movement of 1-16th inch or so is given to the table and the work upon it, sufficient to effectually clear the tool upon its up-stroke. The feed and clearance movements occur both at the beginning of the tool reversing movement, and while the pinion shaft is under full power.

The horizontal bracket guide above affords an excellent support for the upper end of the cutter bar. It may be adjusted at any height required. The cutter bar used is rectangular in section, and fitted into a round sleeve, and clamped into the head of the ram. A round sleeve with a rectangular groove is also used in the upper guide. The machine is supplied with an oil tank, and when working steel the oil is used freely, a pan underneath catching the oil and chips, the oil being recovered by a separator. The table is 16 inches wide by 38 inches long. The machine is powerful enough to work a tool with 2-inch face in cast iron or 1½ inch in steel, with 15-inch stroke.

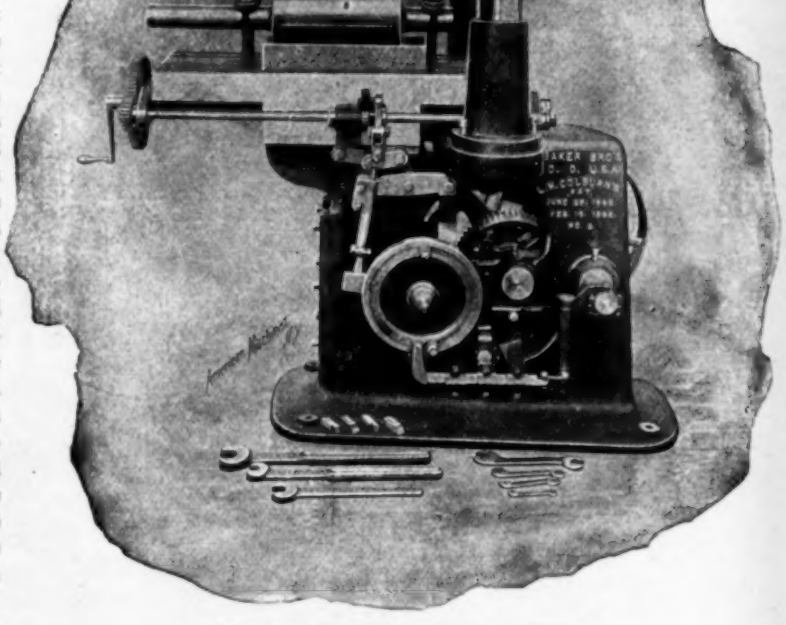


FIG. 1.—IMPROVED SLOTTING MACHINE.

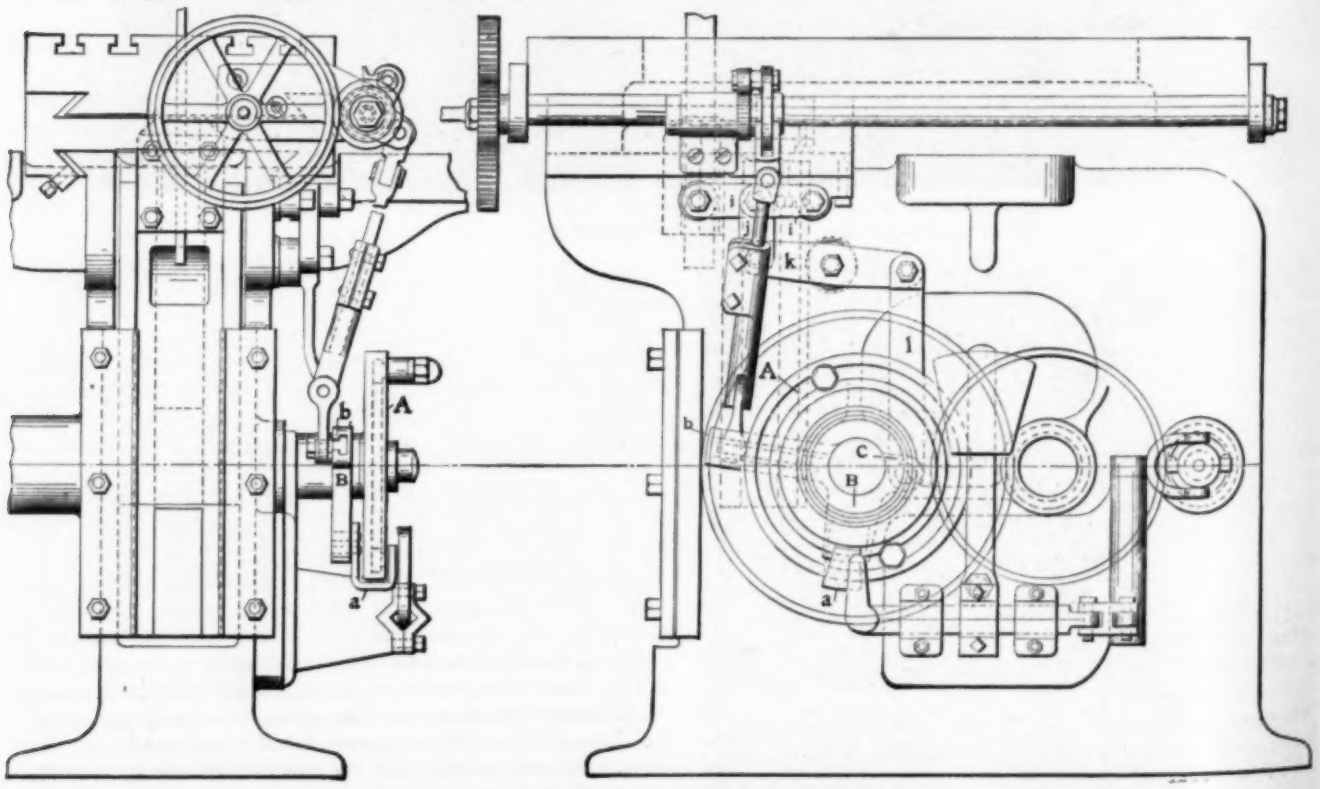


FIG. 2.—DETAILS OF SLOTTING MACHINE.

THE Guggenheim Smelting Co. is making extensive additions to its refining plant at Perth Amboy, N. J. The buildings will be fire-proof throughout, being constructed of steel framework covered with corrugated iron. The contract has been let to the Berlin Iron Bridge Co., of East Berlin, Conn. The Berlin company recently shipped to Mexico two large buildings for the same company.

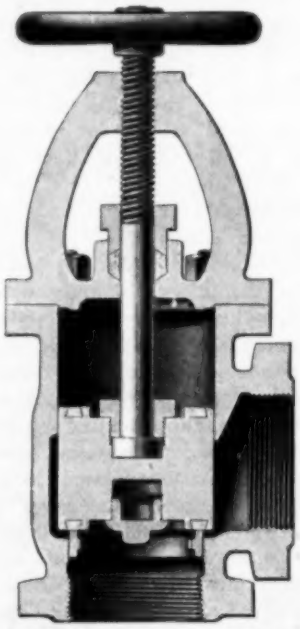
DETROIT STEEL SPRING CO. is running double time.

LUNKENHEIMER BLOW-OFF VALVES.

The iron body angle blow-off valve of the Lunkenheimer Co., Cincinnati, is of heavy pattern and designed for working pressures up to 250 pounds to the square inch. The parts are of iron excepting the stem, disc, nut-lock, disc plug and seat ring, which are of bronze. The reversible bearing faces in the iron disc are filled with Babbitt metal.

The sectional illustration shows that the disc is solid and

fits closely in the barrel of the valve shell, so as to prevent scale and sediment from becoming entrapped on top of the disc, this latter preventing the disc from being readily raised when necessary. The disc is reversible, having two valve or seating faces which can be changed at will. These faces consist of dove-tail slots, which are filled with Babbitt metal and when both are cut or worn out the old Babbitt can be melted out and new metal poured in the slots and faced off, thus re-



newing the principal wearing parts of the valve. The brass seat ring in the body of the valve can also be renewed when cut or worn. The disc is reversed by removing the valve bonnet and taking the entire trimming out of the body of the valve, then unscrewing the small plug at the bottom of the disc, and the disc-lock nut around the valve-stem.

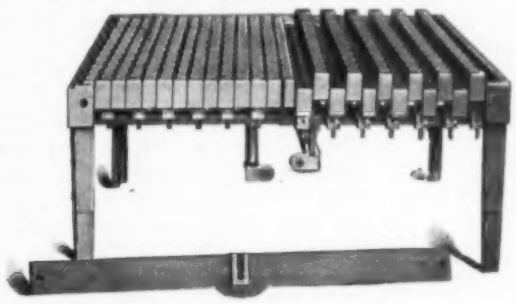
There are three sizes, 2, 2½ and 3 inches, with screw, flange, or screw and flange ends. They can also be furnished made entirely of bronze, for marine purposes.

The American Pig Iron Storage Warrant Co. had 244,400 tons in yard July 31, the statement for the preceding 11 days showing 8,500 tons withdrawn and 500 tons put in yard. On July 31, 1897, there was on hand 232,500 tons; July 31, 1896, 125,600 tons; July 31, 1895, 118,600 tons.

ROSE PATENT SHAKING GRATE.

Each bar of the Rose patent grate is set in its own frame, independent of the boiler or brick work. Thus there is no locking or falling out of bars because of boiler or wall settling or the burning out of walls. Each bar is made in a single corrugated or V-shaped section, and tapering from top to bottom. A center bar extends the length of the frame, dividing it in two sections, and binding it together through the center so as to prevent spreading. Two rockers are suspended in each section of the frame. These are coupled in each section by adjustable coupling bars, which are connected by wrought iron bars to brackets, the latter being bolted on the outside of the fire front. The center bar has its bearings so proportioned that when set in its proper position, in the frame, one bearing will rest on the other outer lug of one rocker and the other bearing will rest on the inner lug of the opposite rocker. The next bar, being reversed, comes in the corresponding opposite position, and in this way the bars are reversed back and forth until the frame is filled.

The operation of the shaking lever causes the rockers to swing in their bearings, giving an up and down motion to the bars, one being raised while at the same moment the next



bar is lowered. The bars in their up and down movement pass each other a sufficient distance to sift out all ashes and dirt, but do not pass far enough to allow coal to fall through into the ash pit. By the action of the rockers a small amount of end motion is given the bars, forward and back, as the rockers swing on their bearings. This up and down motion of the bars, combined with the end motion, while sifting out the ashes and dirt, at the same time lifts the whole fire surface of the section being operated upon and allows the air to pass freely through the bed of the fire. By this action of the bars cutting and raising the fire bed and allowing air to pass freely through, less clinker is formed and the coal is all consumed and heat utilized.

The manufacturers are the Rose Patent Grate Co., Council Bluffs, Ia. H. F. Wilkinson, 15 S. Water st., Cleveland, is Northern Ohio agent.

C. A. Clarke, of the well known machinery firm of Hill, Clarke & Co., Boston and Chicago, was at the Chicago office of his firm for a few days last week. Mr. Clarke says that while business is not as good at present as he could wish, it is still very fair, the season of the year considered, and he is looking for a very large and rapid growth, not only in the machinery business but in every other line, within the next few months. He bases his expectations on the statistically strong condition of the iron and steel market at the present time, and on the belief that conditions following every other panic that has occurred in this country will be duplicated in this instance. In addition to the recovery from the recent business depression, which is now taking place and which is bound to accelerate as time goes on, he refers to the fact that we now have our foreign trade on a very sound and healthy basis, with every promise of largely and rapidly increasing outer trade as a result of the war. On the whole, Mr. Clarke shares the opinion recently expressed by many manufacturers, close students of the situation, that the country is to see a general revival of prosperity, which will be prolonged over a period of years.

An obvious error appeared in the communication of Wm. Garrett concerning the proposed rod mill of King, Gilbert & Warner, at Columbus, O., in our last issue. An extra figure made the writer say that a saving of $41.80 was secured by the location of a rod mill at Columbus. As was evident from the items enumerated, the total was $1.80.

BRITISH IRON AND STEEL EXPORTS FALL OFF.

The statistics of our exports of iron and steel for the first half of 1898 are now to hand, while those as to the exports of iron and steel from Belgium, France, Germany, and the United States, are all sufficiently available to enable us to make a comparison of how wet sand, both absolutely in relation to our own past exports, and relatively in so far as the development of the iron trade of our chief competitors is concerned. It cannot be said that the comparison is a source of unalloyed satisfaction. On the six months' exports our own trade shows a decrease of 201,000 tons in volume and £814 000 in value, which is the most considerable set back that we have had to record for a period of three years. German iron and steel exports, on the contrary, have in the first five months of the current year shown an advance of 127,989 tons, or 23 37 per cent, on the corresponding period of last year. Belgian exports likewise exhibit a considerable advance, although not one-third of the increase recorded for Germany; France is almost stationary, and the United States show a very notable increase under the heads of bar iron, wire, plates and sheets, and one or two other descriptions.

In order to appreciate the recent trend of demand in the several branches of the iron and steel industries, the following comparison is made:

BRITISH IRON AND STEEL EXPORTS—FIRST SIX MONTHS.

	1897. Tons.	1898. Tons.	Increase X or Decrease —.	
Pig iron	571,920	474,704	—	97,216
Bar, angle, etc	79,383	80,859	X	1,476
Railroad iron	425,719	354,761	—	70,958
Rails (included in foregoing)	289,957	287,065	—	2,892
Chairs and sleepers (ditto)	84,538	36,001	—	48,537
Wire	26,196	20,399	—	5,797
Hoops, sheets and plates	55,310	47,188	—	8,122
Galvanized sheets	111,555	114,240	X	2,675
Tin plates and sheets	149,025	135,449	—	13,576
Cast and wrought, etc	198,196	186,997	—	11,199
Old iron	48,072	49,603	X	1,531
Unwrought steel	141,028	143,427	X	2,399
Black plates (for tinning)	28,573	26,961	—	1,612
Manufactures of iron and steel	16,955	15,810	—	1,145

On examining this statement it will be noted that there has been a decrease in all items except bar, angle, bolt, and rod iron and steel; galvanized sheets; and unwrought steel, the slight increase in old iron being of no importance. There has been a notable decrease in the exports of chairs and sleepers. The largest single item specified in the Board of Trade returns is railroad iron, of which our exports in the first half of the current year were 354,761 tons, against 425,719 tons for the first half of 1897. In the export of tin plates and sheets there has been a decrease from 149,025 tons to 135,449 tons, while there has been a diminished consumption of wire, and of hoops, sheets, and plates. The level of our trade f r the first half of 1898, is, in point of fact, almost akin to that of the first half of 1896. This in 1896 was regarded with complacency, but we were then mounting on the crest of a flowing tide, after a period of great depression, whereas it is a different and less consoling matter to now find ourselves sinking into a condition of mediocrity.

Looking a little further into detail, it apears that the British exports of tin plates into the United States has varied from 59,622 tons in the first half of 1896 to 51,080 in the first half of 1897, and to 40,312 in the first half of the current year. Despite this serious fall, the total exports for the first of these three half years were larger than those for the last. In other words, the decline of close on 20,000 tons in our tin plate exports to the United States has been more than made up by our increased exports to Australasia, the Argentine, Brazil, and other countries, although the total for 1898 has been considerably under that for the corresponding period of the previous year. One of the most striking features of the half-year's export business has been the falling off in our shipments of railway material, and more especially in our shipments of chairs and sleepers, which have decreased by close on 50,000 tons. Our exports of rails, as such, have hardly varied to any extent worth speaking of as between 1898 and the first six months of the two previous years, and the same remark applies to the rail exports of Germany, which keep remarkably steady. Our exports of wire, on the contrary, are considerably less than those of the first six months of either of the years 1896 or 1897, and so also with our exports of hoops, sheets, and plates.

While the records of our export trade, as we have already indicated, are not so satisfactory as they might be, it is important to keep in mind that our home demand was never so large as it is at the present time. The total tonnage of ship building on hand at the end of June was over 1,600,000 tons, which will call for close on a million tons of iron and steel in various forms. Then, again, there has been a larger demand than usual for electric lighting, electric railways, and tramways, water, gas, and sewrage works, light railways, and many other purposes, and these demands unitedly have made the volume of our export trade a matter of less concern than usual. Nor must we exaggerate the importance of the fact that, while we have been falling behind in our exports, Germany has been making a considerable advance. This has not been the case all along the line, and last year, as we have repeatedly pointed out, British exports considerably increased, while those of Germany fell off.—[Iron and Coal Trades Review.

BOILER TRADE CONDITIONS.

July is usually regarded as the dullest month of the year—the period when the mills make their annual repairs and remain closed until they have a full order book. This year when they stopped it was with a month's business unfinished and a large volume of new orders pouring in. There is unusual activity in the large boiler shops east and west. While the complaint is that prices are unremunerative, there is no trouble about the demand; and all this in time of war. There has been a moderate stiffening in values which only appear in large transactions and has not as yet affected small lots and for regular trade. It is to be expected that when new contracts are made, and where delivery is at all near by, there will be a better range of profit. Money continues easy, and people generally are getting out of debt. It is noticeable how little there is doing in the way of improvements in boiler shops, a condition that is most noticeable in dull times, when the necessity for greater economy is more in evidence.

During the last 30 days our attention has been forcibly called to the fact that a large number of manufacturers fail to realize that it is almost impossible to secure prompt shipments during the latter part of June and the early part of July. We would call the attention of our readers to the fact that nearly all of the mills close down for annual repairs and inventory about July 1 The tendency is to endeavor to complete all orders possible during the last week in June, and such a condition existing at the mills renders it practically impossible to put in "rush" orders for immediate execution during this period. It is a well-known fact that mills cannot execute an order even under the most favorable circumstances, on the instant; neither are mills always willing to give preference to the latest order received. Each must take its turn. The warehouse stocks throughout the country are carried with the idea of accommodating customers with immediate shipment of material where the necessity for such deliveries is great. It seems that a large number of buyers have been educated of late years to make unreasonable demands for mill shipments, and we think that many of their customers could be induced to pay the slight difference in cost, necessitated by stock shipment, provided they secured the delivery which such shipment would insure. In years past, a shipment within less than two or three weeks was considered remarkably prompt, but all mills know that it is common to receive orders to-day, on which customers specify that shipment must be made within two or three days from receipt of order. Such unreasonable demands are demoralizing and cause a great deal of annoyance to all concerned, whether manufacturer, dealer or contractor.—[Boiler Maker.

THE stock of warrants in the market available at present prices is reduced to a few hundred tons. Bids of $6.75 were made to all the holders of 2 foundry warrants without finding sellers. At $6 there are perhaps one or two thousand tons of 4 foundry warrants on the market. The stock of iron in warrant yard reached high-water mark at the end of February last, when 283,600 tons were held in the yards of the company. During the month of July 17,100 tons were taken out and 3,500 tons received into the yard. The stock to-day is 243,700 tons.—[Metal Market, New York.

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"BLUE STEAM."

Ever notice the color, or apparent color effect, of a jet of steam issuing from a pet cock in a live steam main? Was it whitish? That was due to entrained moisture. The bluish color, or perfect transparency, is present only when the steam is dry.

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In our new Separator catalogue, which is fully illustrated, we detail something like 105 different sizes and constructions—building Separators to suit the conditions, being one of our hobbies. Postal requests or catalogues will not be noticed.

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INDUSTRIAL SUMMARY.

New Buyers in the Market, and Some of Their Wants:—

[If you are in need of machinery of any description, please notify *The Iron Trade Review*, and we will put you in communication with our advertisers at once.]

The New Jersey & Pennsylvania Concentrating Works of Edison, N. J., want a second-hand tank with a capacity of from 5,000 to 8,000 gallons. In writing, give all dimensions and particulars as to thickness of material.

The Daimler Mfg. Co., of New York, has been incorporated to manufacture all kinds of machinery to be operated under patent motors designed by Gottlieb Daimler. Capital, $500,000. Directors, Frederick Kuebler, and Adolph O. Krieger, of Long Island City; Horace Bacon, Henry A. James, Otto G. Nestle, Peveril Meigs, Jr., and Morth McLean, of New York.

The Martin-Dacey Machine Co., has been organized at Florence, Ala., and will begin operations at once. The machinery of the Dacey Machine Co., of Sheffield, will be moved to Florence, and the new machinery added to it. R. M. Martin, of Florence, and J. T. Dacey, of Sheffield, will manage the works.

Bids will be opened Aug. 29 for one self-contained vertical compound condensing fly-wheel pumping engine of 3,000,000 gallons capacity, by the board of water works trustees, Marietta, O.

At Lancaster, O., Aug. 20, the steward of the Boys' Industrial School will open bids for two compound horizontal duplex pumping engines of 500,000 gallons daily capacity each.

An angle iron straightener for angle iron 1 to 2 inches by ½ and ¼ is wanted at 50 Chester st., Chicago.

New Construction:—

J. P. Wilkinson, Wawasset, Pa., will rebuild his fence works, which were destroyed by fire.

The Pennsylvania & Reading Railroad will erect a machine shop and freight station at Tamaqua, Pa., to cost $10,000.

A new boiler house is to be erected at the pumping station of the Aurora, Ill., water works.

Lindemann & Hoverson, manufacturers of heaters, Milwaukee, are planning to build a new foundry.

Inquiries put out by the Burgess Steel & Iron Works, Portsmouth, O., call for a building 754x165 feet, and proposals are about to be received. The question of right of way through adjacent property for switches is pending.

Plans for the plant of the Titan Steel Co., Chicago, on 20 acres of ground between 100 and 115th sts., Lake Calumet and the Michigan Central tracks at Pullman, have been completed by the Fred W. Wolf Co. The plant will be supplied with all the latest machinery for the manufacture of tubes after the Mannesmann process.

The Challenge Wind Mill & Feed Mill Co., Aurora, Ill., is planning to build a new foundry, to be 40x80 feet in size.

Additions, Enlargements, Removals, Etc.:—

It is reported that the Clinton Bridge & Iron Works, Clinton, Ia., is erecting a large addition to its plant.

The National Shovel Works & Stamping Co., Chicago, has secured three acres of land from the Chicago Heights Land Association, and will at once begin the erection of buildings at Chicago Heights, Ill. The main building will be 80x350 feet, equipped with an electric traveling crane, a 200-h. p. engine and boilers, and other machinery.

The Hansell-Elcock Foundry Co., Chicago, will erect an addition 120x140 feet in size to its plant at Archer ave. and 23d Place.

The Brooks Locomotive Works are building an extension 22x80 feet to their boiler shop. Fifty feet of the width is to be covered by a 10-ton traveling electric crane. All parts of the building except the side walls are to be of structural steel, furnished by the Buffalo Bridge & Iron Co. The old portion of the building, 220x77 feet 8 inches, is to have a new roof

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MONTREAL, J. G. Sibbald, 3 Windsor Hotel.
SAN FRANCISCO, John Woodlock, 26 Beale St.

and to be equipped with a riveting tower at one end and a 25-ton electric traveling crane of 50 feet span to travel the entire length of the building, and to run over the 10-ton crane where the new part joins the old.

The Pennsylvania Steel Co. will build an addition to its billet mill at Steelton.

The plant of the Brooklyn Wire Nail Mill, operated by A. R. Whitney & Co., has been moved to Duncansville, Blair County, Pa., and added to the equipment of the Portage Iron Works. The capacity of the wire nail mill has been doubled by the addition of new machinery for the manufacture of wire nails. The Duncansville hoop mill is now busy on cotton ties.

At the marine engineering works of the James Clark Co., Baltimore, Md., some new construction is going on. A group of buildings, 220x60 feet will be added, these taking in pattern shop, machine shop, and blacksmith shop A new boiler house will be added later.

Fires and Accidents:—

The Canada Rolling Mills & Horse Shoe Works, of Peck, Benny & Co., Montreal, Que., were badly damaged by fire, Aug. 3. Loss about $100,000; insured.

The Reading Tin Plate Co., Reading, Pa., suffered a loss of $10,000 by fire starting in the tin department, Aug. 2.

At Brunnerville, Pa., the foundry and machine shop of Aaron Wisler burned July 31, with $12,000 loss.

Fire destroyed the boiler house and hoisting building at the Traders' mine, Iron Mountain, Mich. Loss, $2,000.

General Industrial Notes:—

The Illinois Steel Co. is remodeling some of the heating furnaces in the Milwaukee works, putting in continuous furnaces designed by Alex. Laughlin & Co., of Pittsburg. The works have been greatly changed in the past two years, important economies having been introduced.

The present plant of the Sylvan Steel Co , at Moline, Ill., although built recently and considered modern, is being reconstructed on the continuous system, in order to put it on an equal footing with its competitors in every respect. A Laughlin heating furnace will take the place of three old-style furnaces. Billets will be fed into this furnace at one end and delivered heated from the other by a compressed air pusher. Automatic conveyors take the heated billets to the 16-inch mill, which is served by tables. After being roughed down, the bars go to the12-inch mill, and if necessary by repeaters to the 8-inch mill. The 12-inch mill is to be enlarged by three more stands, so as to turn out a greater amount of work. The number of men will be reduced by these improvements, while the output will be doubled. It is the intention of the company to turn out its own steel, and two l asic open-hearth furnaces, having a capacity of 60 tons in 24 hours, have already been built, which will be followed by others. Another continuous heating furnace will probably be built before the close of the year. Manufacturing operations are to be resumed in August. The works will be started with plenty of orders on the books.

The property of the Irondale Furnace, at Independence, Preston Co., W. Va., including a narrow gauge railroad, several dwellings and 1,300 acres of land, has been sold by the United States Marshal to Thomas P. Conrad, who bought the furnace for $7,000, and C. H. Bachman, of Wheeling, who bought the houses and land for $4,800.

Bonds to the amount of $25,000 have been sold, the proceeds to be used to repair the old rolling mill of P. L. Kimberly at Sharon, Pa. The plant has been idle for over five years, but it is expected to get the hoop mill ready for operation within 30 days. Other departments will also resume as soon as they are ready.

The real estate and property of the Duquesne Tube Works at Duquesne, was sold Aug. 2, to the Carnegie Steel Co., for $141,500, subject to a mortgage of $9,000. The plant has been idle, and in the hands of a receiver, for some years. It includes 20 acres of land with butt and lap weld mills, machine shop, etc., and adjoins the Carnegie Co 's Duquesne plant.

The Blairsville Rolling Mill & Tin Plate Co., Blairsville, Pa., will install some new equipment. The 28 inch cold rolls will be replaced by a 34-inch mill and other changes will be made.

The Birmingham Rolling Mill Co., Birmingham, Ala., will increase the capacity of its steel plant, which has been producing steadily its full output of 160 tons a day.

The Pennsylvania Steel Co. now has very close to 6,000 employes at Steelton, an increase of nearly 2,000 over August, 1897.

Thirty puddling furnaces were fired on the starting up of the Frankstown plant of the Oil Well Supply Co., Pittsburg. The pipe mill will start later.

Reade & Bowler, 216 American Trust Bldg., Cleveland, offer for sale all the power equipment and tools in the plants of the following companies: Akron Steam Forge Co., Elwood, Ind.; Findlay Rolling Mill Co., Findlay, O.; Akron Iron & Steel Co., Akron, O.; Harrisburg Car Mfg. Co., Harrisburg, Pa.; the J. F. Seiberling Co., Akron, O.; the Lane Bros. Bridge & Construction Co., Newark, O.; City Point Shipyard, Boston, Mass.; Viaduct Brass Works, Cleveland,

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MANUFACTURERS OF

Bessemer Pig Iron, Steel Billets, Blooms, Black Plate, Tin Plate, Tin Plate Bars, Wire Rods, Market Wire and Wire Nails.

O.; Neracher Wood Trimmer Co., Cleveland, O., and an agricultural implement works, Davenport, Ia. They also offer for sale as a whole the Minerva Car Works, Minerva, O., and the Huntington Car Works, Huntington, Pa.

The Ohio Tube Co., Warren, O., held its annual meeting Aug. 3. Directors elected are: O. C. Barber, of Chicago, president; H. C. Ellison, of Cleveland, vice-president,; D. P. Wheeler, of Akron, secretary; F. M. Peet, treasurer and manager.

The Schoen Pressed Steel Co., Pittsburg, has been asked to bid on six steel cars for the Bethlehem Iron Co., that will carry 150,000 pounds. These cars are the largest ever designed, and will be used by the Bethlehem company, if built, for hauling large guns for the Government. The cars are to be 36 feet long and flat, and will be very similar to the 100,000-pound cars now being built for the Pennsylvania Railroad. The steel bottoms, however, will be greatly strengthened with beams, and the cars will weigh 30,000 pounds.

A Philadelphia dispatch says that the Southwark Foundry & Machine Co. has orders enough to keep its plant running for ten months. It had occasion recently to ask other establishments to help out on certain work, and found that they were all busy, and could not take further orders at present.

The American Steel & Wire Co.'s plant, at Rankin, Pa., has resumed after a six weeks' shut-down.

The old Iron Bay Works, at West Duluth, Minn., are expected to be in operation manufacturing car couplers, Aug. 15.

The Deere & Mansur Co., Moline, Ill., reached an agreement with its molders and other employes and it will be signed for one year. The plant has started up earlier than usual and, it is expected, will run steadily to July, 1899.

The plant of the Corns Iron & Steel Co., Massillon, O., will be closed for repairs on Monday, Aug. 15, when the machinery will be given the annual overhauling.

The American Steel Casting Co., Sharon, Pa., has received an order from an Eastern firm for a large fly wheel. The four segments will weigh 50,000 pounds.

C. H. and W. M. Drane, Jr., have bought the interest of F. Bates in the Clarksville, Tenn., foundry and will operate it under the firm name of Drane & Co. It is one of the best equipped foundries in the State.

The Edward P. Allis Co., of Milwaukee, has taken the contract for two 36x48 blooming mill engines for the new steel plant at Ensley City, Ala.

Kaltenbach & Griess, engineers, 26 South Water st., Cleveland, have recently supplied one of their portable concrete mixers to the Cincinnati Water Works. For the new pumping station, now under construction at Cincinnati, they also supplied five Lidgerwood hoisting engines. Hoisting and handling machinery and mixers for the concrete work of the Cleveland breakwater have also been supplied. Another contract is for complete equipment for the Mascot Gold Milling & Mining Co., of Montana. A large amount of work is under negotiation, much of which is expected to be definitely closed within another month. The firm have the agency in Ohio and West Virginia for the Worthington water tube boiler, a

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number of which have been placed. Messrs. Kaltenbach & Griess are designers of machinery for special engineering and construction work. They have recently built mammoth clamp hooks, weighing 6,000 pounds and made of Otis cast steel, for handilng 16 to 20-ton concrete blocks. The feature of these hooks is their effective compressive power, which is exerted without any crushing or marring of the material handled. It is possible to exert a pressure of 112,000 pounds at the four contact points. Another installation recently made by the firm was an electric crane for the Craig Ship Building Co., of Toledo, O. Previous to the formation of the firm Mr. Kaltenbach was connected with the Lidgerwood Mfg. Co., of New York.

The Westinghouse Machine Co. has received the initial order for a complete steam plant, involving a 100 h. p. Westinghouse engine and Westinghouse generator, together with boiler, pump, piping, etc., to be installed in Santiago de Cuba.

The annual statement of the Capewell Horse Nail Co., which has factories in Hartford, Conn., and London, Eng., shows the capital paid in to be $300,000. Letters patent represent $100,000; cash value of the real estate, $100,000. In addition the cash value of personal estate, exclusive of patents, is $250,000, and the credits amount to $150,000.

Citico Furnace, Chattanooga, Tenn., has stopped for repairs.

R. D. Wood & Co.'s Millville, N. J., pipe foundry is working over-time to fill orders for Dublin and London. Shipments have been made recently to Egypt.

After a two-months' shut-down, during which extensive improvements have been made, the south mill of the Lackawanna Iron & Steel Co., Scranton, Pa., resumed this week.

The new stack now being erected at Keystone Furnace, of the Reading Iron Co. is to have a capacity of 1,800 tons a week. The company has also completed plans for a modern pipe mill on the site of the old mill.

It is reported that the Lorain Steel Co. is planning to get 75,000 tons of ore on its docks this season, as its furnace plant will probably be completed before the opening of navigation in 1899.

The Pennsylvania Steel Co., has ordered its No. 1 furnace out of blast for repairs. It is hoped to have the furnace ready by Oct. 1. The furnace was blown in about five years ago, and since that time has been working steadily, with large outputs.

The contract for a locomotive yard crane and for the 50-ton traveling crane for the open-hearth building of the Alabama Steel & Ship Building Co. has been let to the Brown Hoisting & Conveying Machine Co., of Cleveland.

At the annual meeting of the stockholders of the Mahoning Valley Iron Co., Youngstown, O., the old board of directors was chosen and they elected George D. Wick, president; Martyn Bonnell, vice-president; Harry Bonnell, secretary, and William F. Bonnell treasurer.

The regular annual stockholders' meeting of the Cumberland (Md.) Iron & Steel Shafting Co. was held recently, and the following directors elected: Merwin McKaig, Wm. M. McKaig, W. J. Muncaster, Wm. Pearre, Robert Shriver, R. R. Henderson, Edwin DuBois, A. Charles. The directors then met and elected Merwin McKaig, president; W. J. Muncaster, vice-president and general manager, and Albert Charles, secretary and treasurer.

The Pioneer Mining & Mfg. Co., of Thomas, Ala., has purchased new coal lands, at North Birmingham, Ala., and will open a large mine at once. A capacity of 2,000 tons daily is expected, and a railroad will be constructed to the company's furnace plant. About $100,000 is to be expended. The company's second furnace, at Thomas, will be put in blast soon.

Chicago Heights Activity.

Considerable industrial activity is being displayed at Chicago Heights, Ill., the enterprising manufacturing suburb of Chicago. One new concern has located there recently, others are considering propositions to locate and several of the older manufacturers in the town are enlarging their plants. The National Shovel Works & Stamping Co., has secured three acres of land from the Chicago Heights Land Association, and will at once begin the erection of large factory buildings, suitable for its business. The main building will be 80x350, and will be equipped with an electric traveling crane, a 200 h. p. engine and boilers, and modern machinery. The representatives of the company chose Chicago Heights on account of cheap fuel, railway and shipping facilities, and other advantages that assist in reducing cost of production, and cheaply distributing product. The Illinois Screw Co. has awarded a contract to G. H. Fuller for the construction of an addition to its works. The new building will be 54x185, and two stories. The works are now being operated during the night, as well as during the day. The Inland Steel Co. is preparing for an extensive business. At the present time it is erecting several large additions and is putting in two 400 h. p. engines, two batteries of boilers, and three new furnaces, which will increase its output, and give employment to about 150 additional men.

S. W. Royse & Co., Manchester, Eng., in their market review of July 30, refer as follows to the course of the British iron trade: "Prices of iron ore are steady, though there is at present little inquiry. Imports again show a decrease, the returns for the first half of this year showing less by 230,442 tons, or £180,944 than during the corresponding period of 1897. Business in pig iron has lately been moving well, and prices at Glasgow and Middlesbrough have advanced some 6d per ton during the present month. The fair holidays have interfered with trade at Glasgow, but at Middlesbrough there has been a continued firmness, and the market is at present strong and a good business doing. The outlook is satisfactory, makers being already well supplied with orders for delivery ahead. The iron trade in the Midlands is also in a good position. The recent quarterly meetings were well attended, and a good amount of business done. Prices in all branches are firm and prospects are bright."